# Accounting and Business Research

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**TQM adoption, institutionalism and changes in management accounting systems: a case study**

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**A benchmark for the adequacy of published financial statements**

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# The 'public auditor': an experiment in effective accountability

**John Richard Edwards, Roy A. Chandler and Malcolm Anderson***

**Abstract**—Mutual associations were created to provide, through a system of self-help, for the welfare of members of the British working class increasingly separated from the family unit characteristic of an agricultural-based economy. The appropriate method for protecting the resources required at some future date by the poorly off in conditions of need produced a challenge for Parliament. This paper examines the development of the concept of the 'public auditor' to describe the individuals considered suitable to undertake the audit of mutual associations, and the increasing statutory emphasis on the desirability of appointing a person 'carrying on publicly the business of an accountant' to certify the annual returns made to the Registrar of Friendly Societies. This paper argues that statutory recognition of the accountant as a member of a skilled occupational group represents an important stage in the professionalisation process. This paper shows that the concept of the public auditor was rejected by most mutual associations, while the larger organisations made the voluntary decision to appoint professional accountants to undertake the audit function.

## 1. Introduction

A complex array of events conspired to help accountancy achieve recognition as one of the new professions[1] designed to provide valued services for society in the period of rapid economic development and social change that occurred during and following the British industrial revolution.[2] The 19th century saw important stages in the emergence of accountants as an identifiable occupational group. One identifiable stage in the professionalisation process is believed to be the formation of a 'professional' body designed to organise and regulate the provision of a defined range of specialist services (Kirkham and Loft, 1993: 519). The 1880 Royal Charter application of the Institute of Chartered Accountants in England and Wales (ICAEW, 1881), for example, contains the following words:

> 'That the Profession of Public Accountants in England and Wales is a numerous one and their functions are of great and increasing importance in respect of their employment in the capacities of Liquidators acting in the winding up of companies and of Receivers under decrees and of Trustees in bankruptcies or arrangements with creditors and in various positions of trust under Courts of Justice as also in the auditing of the accounts of public companies and of partnerships and otherwise.'

It is well known that the first modern accountancy bodies were formed in Scotland (in Edinburgh and Glasgow) in 1853, and this organisational arrangement was copied in England in the 1870s with five separate associations formed in London (1870 and 1872) and three major northern cities (Liverpool, 1870; Manchester, 1871; Sheffield, 1897) (Parker, 1986: 15). The rise of the external audit function has been of central importance to the development of the accounting profession, both in its own right and because of the access provided to accountants for the supply of additional services relating to the formation, management and liquidation of the business enterprise. The company audit was initially performed by shareholders, with the logic of this appointment being that their money was at risk from inefficient or fraudulent management.

The effectiveness of the shareholder audit (alternatively referred to as a members' or an amateur audit) is likely to have lessened as businesses increased in size and the record keeping and financial reporting systems became more complex. Their perceived superficiality led them to be dismissed as 'biscuit and sherry audits' (Robb, 1992: 129), with discoveries of error and fraud in the management of companies that had been the subject of a shareholder audit naturally exploited by an emerging accounting profession keen to capture such work for qualified accountants.

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[1] The early development of the British accounting profession together with different theoretical explanations for the professionalisation process, are summarised in the first four chapters of Matthews et al. (1998).

[2] The British industrial revolution is conventionally assigned to the period 1760–1830 (Ashton, 1948).

The purpose and objective of the nineteenth century audit have been the subject of academic debate, as has been the nature of the audit work performed. Much of this discussion has been based on secondary source material, with opinions on the main thrust of audit objectives varying from a preoccupation with the detection of error and fraud to a concern with verifying the messages contained in published financial reports (Chandler et al., 1993; Flint, 1971; Lee, 1979).

Turning to the nature of the audit work undertaken, it seems likely that practices ranged from a mere comparison of the balances in financial statements with those in the books to an in-depth verification of transactions, the proper valuation of assets, liabilities and profit, and an assessment of the adequacy of disclosure practices. The general conclusion of the literature is that the shareholder was more likely to perform the first type of audit (sometimes dubbed the mechanical audit) and the professional the latter, but there is clear evidence that qualified accountants, and sometimes even the profession's leaders, could not always be relied upon to do a thorough job (Chandler and Edwards, 1996).

A feature of the rising public status of an occupational group is parliamentary recognition of its members' suitability to perform certain specialised tasks (Macdonald, 1995: 191). Accountants first achieved this accolade when identified as one of the groups suitable for appointment to the position of official assignee in bankruptcy by the Bankruptcy Act 1831 (1 & 2 Will. 4, c. 56, s. 2). Further early evidence of an enhanced public profile resulted from statutory recognition of a possible inability on the part of shareholders to undertake an efficient audit. The Companies Clauses Consolidation Act 1845, containing adoptive provisions for statutory companies, made it 'lawful for the Auditors to employ such Accountants and other Persons as they may think proper, at the Expence of the Company' (7 & 8 Vict., c. 16, s. 108).

Corresponding provisions for voluntary adoption by registered companies were contained in the model articles attached to the Joint Stock Companies Act 1856 (19 & 20 Vict., c. 47, Table B, art. 83) and the consolidating Companies Act of 1862 (25 & 26 Vict., c. 89, Table A, art. 93). Where the body of shareholders failed to make an audit appointment, the Joint Stock Companies Act 1844 required the Committee of the Privy Council for Trade to appoint an auditor on the application of a single shareholder (s. 38).[3] There was no requirement that the appointee should be an accountant, though we might expect that the Board of Trade selected this option because we do know that they appointed public accountants in response to shareholder demands for 'one or more competent inspectors to examine into the affairs' of a company under the Joint Stock Companies Act 1856 (s. 48).[4]

It is the purpose of this paper to examine the audit provisions put in place for the protection of stakeholders in mutual associations[5] during the 19th century; a period that encompassed a considerable growth in their economic significance. Variety in the nature and size of mutual associations gave rise to perceived differential requirements in terms of accounting control, and this resulted in significant differences in the arrangements favoured and put in place by Parliament. Also, we find the legislature supporting the adoption of more stringent audit requirements than those stipulated for the business sector. Following the passage of the Joint Stock Companies Act 1856, there were no statutory audit requirements imposed on registered companies in general until sections 21–23 of the Companies Act 1900 (63 & 64 Vict., c. 48) took effect. An external audit requirement for railways was implied by the Railway Companies Act 1867 (30 & 31 Vict., c. 127, s. 30) and introduced for banks by the Companies Act 1879 (42 & 43 Vict., c. 76, s. 7) as part of the response to company failure in those business sectors. In none of these cases was there any indication that the audit should be undertaken by an accountant.

This paper explores the idea that mutual society legislation might be properly seen as representing a major breakthrough in parliamentary recognition of accountants as comprising a skilled occupational group. In particular, we examine Parliament's experimentation with the concept of the public auditor and its imposition of requirements for the annual return of certain larger friendly societies to be certified by an individual 'carrying on publicly the business of an accountant'.

The remainder of this paper is structured as follows. The origin, objects and growth of mutual associations during the nineteenth century are first described. The audit provisions in place and arrangements made by such organisations *circa* 1870, when a Royal Commission was appointed to investigate their affairs, are next considered. The recommendations of the Commissioners are identified and the impact on legislation relating to audit requirements explored. The paper then examines the relevant evidence collected and recommendations made as the result of the second major inquiry into mutual associations undertaken by the Select Committee appointed in 1888 and reappointed in 1889. Consequential legislation is summarised and we then present our concluding remarks. The resources used for this study are parliamentary papers covering principally the period 1871–94, statute law, the works of contemporary writers and more recent secondary sources.

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[3] The model provisions contained in the Joint Stock Companies Act 1856 required an application to be made by one-fifth of all shareholders (art. 81), while those attached to the 1862 Act specified five shareholders (art. 91).

[4] William Quilter and William Turquand were the permanent inspectors appointed by the Board of Trade to investigate and report on businesses whose shareholders called management into question under the Companies Act 1856 (Bywater, 1985: 793).

[5] The term 'mutual associations', in this paper, covers friendly societies, industrial and provident societies and building societies.

## 2. Origin, objects and growth of mutual associations

The common objective of mutual associations was to provide for individual welfare through a system of self-help. The humble origin of the friendly society is colourfully described by Jones (1904: 2) who sees

> '...its beginnings in poor and insignificant Sick and Burial Societies, formed years ago by "rude forefathers of the hamlet," gathered together for social intercourse at the village public-house; their inception inspired, to a large extent, by the horror with which the working class has ever regarded "being buried by the parish," and also in some degree, no doubt, by the longing for a showy funeral, not extinct even at the present day among many of the same class; the ambition, as a certain humorist said of himself, to die, even though they have not lived, "beyond their means"'.[6]

The Friendly Benefit Society of Bethnal Green was founded as early as 1687, but it was from about 1760 that the number of friendly societies began to increase rapidly (Gosden, 1961: 2). The growing urbanisation of Britain during the industrial revolution produced concern that individuals were no longer able to rely on family support in times of difficulty, thereby increasing the risk of greater dependence on provision at the parish level.[7] The preamble to the 'Act for the Encouragement and Relief of Friendly Societies', 1793, sums up the nature of contemporary concerns and how they might be alleviated by the success of such entities:

> 'Whereas the Protection and Encouragement of Friendly Societies in this Kingdom, for raising by voluntary Subscription of the Members thereof, separate Funds for the mutual Relief and Maintenance of the said Members in Sickness, old Age, and Infirmity, is likely to be attended with beneficial Effects, by promoting the Happiness of Individuals, and at the same Time diminishing the publick Burdens, may it therefore please your Majesty that it may be enacted...' (33 Geo. 3, c. 52)

It was estimated that 5,117 local clubs had registered under the Act by 1801, with very many more unregistered societies believed to have been in existence at that date (Gosden, 1961: 4).

Building Societies are thought to date from the eighteenth century,[8] being commonly established as terminating societies whose affairs, as the name implies, were concluded at a fixed date or when a result specified in their rules (usually the building of an estate of houses) was attained (Grant-Smith, 1903: 3).[9] The permanent building societies evolved out of the terminating societies and, in contrast, remained in existence as long as there were members to serve and business to be done. Building societies were the subject of separate regulation from 1836, when an Act designed for their encouragement and protection informs us that such organisations had been 'established in different Parts of the Kingdom principally amongst the industrious Classes for the Purpose of raising by small periodical Subscriptions a Fund to assist the Members thereof in obtaining a small Freehold or Leasehold Property...' (6 & 7 Will. 4, c. 32).[10]

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[6] The 'certain humorist' referred to is probably Oscar Wilde (1854–1900) but, if so, the attribution was the subject of poetic licence. A possible remedy for Wilde's diminishing health in later life was thought to be a difficult operation performed by a leading surgeon. A huge fee for the operation was mentioned, provoking the response: 'Ah, well, then, I suppose that I shall have to die beyond my means' (quoted in Sherard, 1906: 421).

[7] The Poor Law Act 1601 had imposed on each parish 'responsibility for maintaining its own impotent poor, the sick and aged, for educating and apprenticing its orphan and deserted children, and for finding useful employment for its own unemployed' (Slater, 1935: 333).

[8] Bellman (1935: 9) tells us that the first building society was formed in Birmingham on 3 December, 1781, Price (1958: 14) suggests the early 1770s, while Ashworth (1980: 2) believes that the Ketley Building Society, Birmingham, was the first to be established in or about 1775.

[9] For a detailed explanation of the operation of terminating societies, see the evidence presented by James Higham, secretary of the Fourth City Mutual Building Society to the Commissioners appointed to enquire into Friendly and Benefit Building Societies, First Report, BPP 1871, xxv, minute 2850 *et seq*.

[10] Early societies, such as that established in Birmingham in 1781, were actually engaged in building houses, but the wording of the enabling statute indicates that, by 1836, building societies were principally a mechanism for helping the 'indus-

Industrial and provident societies are the third mechanism for self-help considered here; the distinctive feature being that they undertook trading transactions to help achieve their objectives and often evolved into formal trading organisations referred to as co-operatives. According to a former Registrar of Friendly Societies,[11] E. W. Brabrook, the label industrial and provident society was 'intended to intimate the design that such societies should be industrial as making their profits by the mutual personal exertions of the members and provident as distributing their profits by way of a provision for the future' (quoted in Chappenden 1966:1). Such societies were covered by the Friendly Societies Acts up to 1852[12] when the first Industrial and Provident Societies Act (15 & 16 Vict., c. 31) extended their range of permissible activities, subject to certain exceptions, to that of 'exercising or carrying on in common their respective Trades or Handicrafts'.

The Industrial and Provident Societies Act 1862 (25 & 26 Vict., c. 87) conferred corporate status and limited liability on these bodies which, from 1867, were allowed to undertake the business of banking and to receive small savings deposits from members. According to Chappenden, the consolidating measure—the Industrial and Provident Societies Act 1876 (39 & 40 Vict., c. 45)—constituted an 'almost self-contained code of law' (1966: 3) and thereby provided 'the framework of legislation within which co-operative and similar societies' could work and develop (1966: 4).

The scale of operations of mutual associations increased considerably over the years. The number of societies registered with the Chief Registrar of Friendly Societies at 31 December 1899 (these figures covered friendly societies and industrial and provident societies) totalled 27,783, representing a membership of 11,750,130 and having invested funds of £39,487,619 (Jones, 1904: 2). The annual report for building societies of the same year showed that there were 5,286 registered societies with 612,874 members and deposits of over £56m. (*The Accountant*, 5 May, 1900: 414).

## 3. The audit of mutual associations, *circa* 1870

The 19th century saw the creation of the limited liability company to encourage the development of the joint stock business enterprise. The appropriate mechanism for protecting stakeholders became a major preoccupation of numerous government committees and commissions.[13] Comparable developments occurred in the case of mutual associations, with a series of inquiries including major investigations undertaken by the Royal Commission appointed to enquire into Friendly and Benefit Building Societies in 1870 and by the Select Committee on Friendly Societies of 1888 (see below). The Commissioners appointed in 1870 were directed to enquire into: the existing state of the laws relating to friendly societies; the operation of the acts relating to friendly societies and building societies; the organisation or general condition of societies established under such acts; and the office and duties of the Registrar of Friendly Societies (Fourth report, BPP 1874, xxiii, pt. 1: xiii). The Commissioners examined 277 witnesses and produced four separate reports.

The aspects of accountability occupying the attention of the Royal Commission included the form of the annual return to the Registrar and the nature of the audit arrangements previously put in place. The enabling Act of 1793 had contained powers of audit, providing for the treasurer's accounts 'to be examined, and allowed, or disallowed' by the general meeting (33 Geo. 3, c. 54, s. 7). The Friendly Societies Act 1829 made it clear that the treasurer could be called to account at any time by the members (10 Geo. 4, c. 56, s. 14) or by any committee to which relevant powers had been delegated (s. 12, s. 14). In addition, the treasurer was required, annually, to prepare a 'general statement of the funds and effects' of the society 'together with an account of all and every the various sums of money received and expended' (s. 33). Under this Act, the powers of audit previously exercised by the general meeting were delegated through the requirement for the affairs of friendly societies to be 'attested by two or more members of such society appointed auditors for such purpose' (10 Geo. 4, c. 56, s. 33).[14] The failure to make explicit the method of appointing auditors was addressed by the 1855 consolidating Act which referred to the need for 'a just and true account of all monies received or paid' by the treasurer to be 'audited by some fit and proper person or persons' appointed by the committee of management (18 & 19 Vict., c. 63, ss. 22).[15]

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trious classes' to accumulate funds for the purpose of property acquisition (Bellman, 1935, ch. 2).

[11] The post of Registrar of Friendly Societies was created in 1846 (Gosden, 1961: 180).

[12] Provision continued to be made for many of the rules relating to friendly societies also to apply to industrial and provident societies or to building societies. Section 8 of the 1852 Act, for example, made it clear that the laws relating to friendly societies applied except as varied by the act or stated to be inapplicable.

[13] For extracts from the reports of a range of those appointed between 1836 and 1900 to enquire into businesses formed for profit, see Edwards (1986).

[14] The Building Societies Act 1836 (6 & 7 Will. 4, c. 32) extended to building societies the provisions of the Friendly Societies Act 1829, again naturally including the audit requirement.

[15] The significance of this wording was to remove the effective restriction on audit appointments to members of the society.

Despite these Parliamentary initiatives, strong support for leaving the development of accountability to market forces, in the case of nineteenth century friendly societies, may be found among the papers of the Royal Commission.[16] Thomas Young Strachan,[17] manager of the Newcastle-upon-Tyne Permanent Building Society, described as the largest building society in the four Northern counties, argued that it was not possible, by legislation, to 'make the public safe in their dealings with the society' (BPP 1871, xxv, minute 4,666). Instead, Strachan favoured providing people with the means to judge matters for themselves, as reflected in the Newcastle Society's decision to display a copy of 'our balance sheet' in every branch of the society (minute 4,667).

In the audit market for mutual associations of the 1870s, the function was generally performed by members, being an arrangement which corresponded to the traditional shareholder audit of joint stock companies that was beginning to give way to a professional audit around this time (Anderson et al., 1997). The case in favour of the members' audit was presented by John Tatum Stanesby, secretary and actuary of the West London Permanent Mutual Benefit Building Society, in a major text published in 1875. According to Stanesby,

> '...in most cases members may be selected from the general body, who are sufficiently acquainted with book-keeping to see whether the facts are clearly recorded, and the figures correctly put together; and where the services of such can be secured, the society will not only avoid a serious expense, but will also obtain a more popular form of satisfaction from the testimony of their own body, than any formal certificate, from a professional auditor, could afford.' (1875: 11–13)

A further argument presented for a members' audit was that such individuals 'may be presumed to be better acquainted than any other accountant outside the society could be with the details of which the accounts are made up, and, consequently, to be more alive to irregularities therein' (Stanesby, 1875: 12). Stanesby nevertheless accepts that it may sometimes 'be desirable to call in the services of a professional accountant' (1875: 11).

Although the audit was often *conducted* by the members, the auditors were not *appointed* by the members. The 1855 Act provided for the auditors to be appointed by the committee of management which therefore made the choice between amateurs (the members) and professionals. Thomas Fatkin, secretary of the Leeds Permanent Benefit Building Society, informed the Royal Commission that his society adopted the latter course, with the accounts 'audited by two professional auditors, who are paid' (minute 5,033). Similarly, Strachan arranged for the accounts of the Newcastle-upon-Tyne Permanent Building Society to be audited by public accountants:

> 'I instituted the system of having them [the balance sheets] audited by public accountants, and it has extended very much now in Newcastle. The accounts of almost all the Newcastle societies are audited by public accountants, men of experience and ability, and by whose means I think that the public, knowing the parties, and the mode of conducting the society, and being upon the spot, and seeing our balance sheets, would have the best means of judging.' (BPP 1871, xxv, minute 4,667)

Harmood W. Banner, father of the leading professional accountant of the late-Victorian era, John Sutherland Harmood Banner (Davenport-Hines, 1985), informed the Royal Commission that he had audited the Royal Liver Friendly Society since 1861 (BPP 1872, xxvi, minute 22,067). Apparently, he owed this appointment to his standing as 'the most eminent auditor in Liverpool' (minute 23, 433–4). Despite these examples it is likely that the appointment of 'public accountants' as auditors was confined to a relatively small number of the largest organisations at this date.

In their report, the Commissioners devote considerable space to presenting a critical assessment of the balance sheets published by societies and the audit arrangements made. They refer to the fact that Charles Frederick Finney[18]—'a Liverpool Accountant and respectable witness'—believed that 'these untrustworthy accounts are audited in an equally unsatisfactory manner', but continued:

> 'A broad distinction must no doubt be made in this respect between the societies which employ well-known professional accountants as auditors, such as the "Royal Liver" and those who either retain, almost as clerks, men of a much lower standing, [such] as the United Assurance, or dispense altogether

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[16] Critics of today's apparently inexorable drive towards greater regulation forcefully argue the case for leaving matters of accountability to the market (Beaver, 1981; Wallace, 1980; Watts and Zimmerman, 1986; Whittington, 1987). Indeed, the ability of the market to exert sufficient pressure to ensure the imposition of an external audit in the absence of regulation has been demonstrated for Britain in the nineteenth century (Anderson et al., 1996, 1997; Watts, 1977), and remained the situation elsewhere in Western Europe until much later, for example, the Netherlands (Lee, 1982: 76).

[17] A partner in the Newcastle accounting practice of Strachan, Ormond & Taylor, Strachan was subsequently appointed one of the public auditors for Northumberland and Durham when that position was created under the Friendly Societies Act 1875.

[18] Finney was a founder member of the ICAEW.

> with the services of professional men.' (BPP 1874, xxiii, Pt. 1: cxix–cxx)

The Commissioners move on to point out that even the type of investigation undertaken by Harmood Banner—'a gentleman of high position in Liverpool and the auditor of the important "Royal Liver" society'—was by no means as searching as it might have been (BPP 1874, xxiii, Pt. 1: cxx). They continue:

> 'Having thus shown the value of the auditing system in the society in which it would seem to be most efficiently conducted, it would be almost a waste of time to examine it in societies where it is far less so, and we may fully believe the experienced Belfast witness, Mr. Criglington, when he says "Properly speaking, there is no real audit at all," or another witness at Liverpool, Mr. Caraher, when he says in still bolder terms, "The present audit of those societies is a perfect farce."'

Particular areas of concern included: how to check that the collectors of subscriptions had gathered all that they should and that the societies had received all that they ought; the extent of the auditor's responsibility in relation to the verification of investments;[19] and the level and disclosure of management expenses. The following further extract from the Commissioners' report reveals an attempt to indicate the duties and powers of the auditor:

> 'The rules of any society should be required as now to define the investments intended to be allowed. But no limitations can be effectual if they are not enforced by personal supervision; and it is our opinion that auditors ought to be distinctly made responsible for seeing that the investments of a society actually exist, and are made in accordance with the provisions of the law, that the accounts also are kept in a proper form, and that items of charge not falling properly within the purview of the society are disallowed, or at all events challenged. The responsibility of the auditor in these particulars might be enforced by penalties; and personal penalties should also be imposed on officers or committeemen guilty of any irregularities.' (BPP 1874, xxiii, Pt. 1: ccix)

The question then to be considered was how to remedy the perceived defects and, in relation to the audit of friendly societies, the recommendations of the Royal Commission (BPP 1874, xxiii, Pt. 1: ccxiv) were clear cut:

- 'That an efficient system of audit should be enforced.'
- 'That competent public auditors should be appointed and in part paid by the Government, whose services should be available on fixed and moderate terms, but whose employment should not be compulsory.'

## 4. The public auditor

The regulation of mutual societies was addressed in three major statutes during the two years following the completion of the Commissioners' work in 1874. The Building Societies Act 1874 (37 & 38 Vict., c. 42, s. 40) required the accounts to 'be attested by the auditors, to whom the mortgage deeds and other securities belonging to the society shall be produced'. It imposed no condition concerning their qualification, reflecting an unexplained silence on this matter in the Commissioners' separate report (1872) on the affairs of Benefit Building Societies. The Friendly Societies Act 1875 (38 & 39 Vict., c. 60, s. 14(1)(c)), gave effect to the explicit recommendations contained in the Commissioners' fourth report (1874) when stating that a registered society shall 'Once at least in every year submit its accounts for audit either *to one of the public auditors appointed as herein mentioned*, or to two or more persons appointed as the rules of the society provide' (emphasis added).[20] In response to the Commissioners' criticisms of the way in which the audit function was conducted, the duties of the auditors were spelt out in the following terms:

> '...auditors shall have access to all the books and accounts of the society, and shall examine the general statement of the receipts and expenditure, funds and effects of the society, and verify the same with the accounts and vouchers relating thereto, and shall either sign the same as found by them to be correct, duly vouched, and in accordance with the law or specially report to the society in what respects they find it to be incorrect, unvouched, or not in accordance with law.' (s. 14(1)(c))

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[19] The report reveals a conflict of opinion concerning audit responsibility in this area between Harmood Banner and the actuary, T. B. Sprague, who is credited with devising a 'very ingenious set of books for the Royal Liver' (BPP 1872, xxvi: cxix) and was the author of *A Treatise on Life Insurance Accounts*, 1874. Sprague considered that the responsibility of ascertaining whether the investments of the society were made on good and sufficient security lay with the accountant. Banner dismissed Sprague's view as 'quite mistaken' and insisted that the 'responsibility is with the management' (p. cxx).

[20] See Section 5 of this paper for additional accounting obligations imposed on 'collecting societies' under section 30 of this Act.

We can therefore infer that Parliament was keen to ensure the performance of an efficient audit rather than a mere mechanical audit. The Act also called for the audited accounts to be sent to the Registrar, with a requirement that:

> '...such annual return shall state whether the audit has been conducted by a public auditor appointed as in the act provided, and by whom; and if by any person or persons other than a public auditor, shall state the name, address, and calling or profession of each such persons, and the manner in which and the authority under which they were respectively appointed.' (s. 14(1)(d))

Almost identical audit provisions were introduced for industrial and provident societies by the Industrial and Provident Societies Act of 1876 (39 & 40 Vict., c. 45), s. 10(1)(c)/(d).

Therefore, in the case of friendly societies and industrial and provident societies, the legislature gave practical effect to the concept of the public auditor.[21] The position of public auditor, although created, was not to be forced upon societies; public auditors were to be appointed only where separate provision was not made based on the society's own rules and regulations. The decision to make the appointment of public auditor optional rather than mandatory appears to reflect government intervention as expressed in a letter to the Commissioners from W. R. Malcolm, assistant secretary to the Board of Trade:

> 'I have said that I think it should be made obligatory for all societies to have their affairs investigated, but of course the nature of the investigation would be very apt to vary according to the character of the parties by whom the society is managed. I cannot help thinking that the good societies would be very glad of the opportunity of having their affairs investigated by competent people nominated for the purpose by government, and though I would not force any such submission upon them, I would hold out an inducement to them to submit their affairs, at any rate for the first few years, until sound principles of working had become established and recognised among the members of these societies.' (BPP 1874, xxiii, Pt. 1, Appendix X)

The report of the Chief Registrar of Friendly Societies, 1875, provides a valuable insight into how the experiment with the notion of a 'public auditor' was made operational. The procedure initially followed was to divide the country into 40 districts (31 for England and Wales, six for Scotland and three for Ireland) and to appoint one or more public auditors for each district and place them under the obligation 'to accept for audit the accounts of any society or branch within his district...at the specified rate of fees' (BPP 1876, lxix: 12). The list drawn up by the Treasury is set out as Appendix C to the report and this contains a number of persons nominated by the Manchester Unity of Odd Fellows and the Ancient Order of Foresters[22] in response to invitations to recommend candidates for appointment. We are not told but presume that the Treasury made up its own mind about the rest, possibly responding to recommendations from other friendly societies or to offers from practising accountants.

Parliament did not act upon the Commissioners' suggestion that public auditors should be 'in part paid by the Government'. The individuals appointed by the Treasury were not government officials; their remuneration was to be met by the societies, though the modest rates set out in Appendix C to the Chief Registrar's report for 1875 reflect a concern to keep costs down. A scale allowed a charge of £1.1s.0d for societies consisting of not more than 100 members, a further £1.1s.0d for each additional 100 members up to 500 and, for societies with over 500 members, 10s.6d. in respect of each extra 100 members but for no fee to exceed £52.10s.0d 'unless by special arrangement'.[23] Where a public auditor was appointed, the society was obliged to 'forward all the necessary materials to his office or place of residence, in order to save travelling expenses and loss of time'. At the same time, they were to 'forward to the auditor the annual return or general statement of the receipts and expenditure of funds and effects of the society, made up in the form for the time being required under the Friendly Societies Act'.

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[21] It seems that the state did not in fact contribute to the cost of the audit, but the modest scale of rates specified ensured that the appointment of a public auditor did not impose a significant financial burden on any society.

[22] Clubs called 'Oddfellows' date at least from the eighteenth century, with records for 1748 surviving in the case of the Aristaracus Oddfellows. These clubs grew in number in the nineteenth century and became affiliated as the Manchester Unity of Odd Fellows. The purpose, nature and growth of the Foresters resembled that of the Odd Fellows (Gosden, 1961: 3; Gosden, 1973: 27–30). By 1872, the Manchester Unity of Odd Fellows and the Ancient Order of Foresters, respectively, had 426,663 and 388,872 members. Three years later, the Manchester Unity comprised 3,074 lodges throughout the country (Gosden, 1961: 34). These 'affiliated orders' were described in the final report of the Commissioners as 'the clubs of highest organisation among those invented by working men to suit their own wants at the present day greatly surpassing all others in popularity' (BPP 1874, xxiii, part 1, para. 94).

[23] This last clause suggests that it was possible for the auditor to negotiate a higher fee. These arrangements were paralleled in the case of industrial and provident societies. There, the specified scale of fees was confined to societies with maximum yearly sales of £25,000 or less, with 'the larger societies, moreover, being very well able to take care of their own interests' (BPP 1877, lxxvii: 39).

The rates of remuneration were clearly not generous, though it should be pointed out that there are plenty of examples of professional accountants auditing the accounts of *quoted* companies in the latter part of the 19th century for less than £52.10s.0d (Anderson et al., 1996). Appendix C to the Chief Registrar's report for 1875 lists 38 public auditors appointed in England and Wales and three in Scotland.[24] These we have compared with the contents of *The Accountants' Directory for 1877* compiled by Alfred C. Harper, ASAE.[25] Thirteen of the public auditors appointed for districts in England and Wales and all three for Scotland are listed therein. Twelve of the English and Welsh grouping were founder members of the ICAEW, in 1880, while all three Scottish accountants were members of the Society of Accountants in Edinburgh in 1877 (Harper, 1877). Two of the public auditors (C. F. Kemp, for London, and Monkhouse & Co., for Newcastle) feature in the league table of top 22 auditors of quoted companies in 1886 (Anderson et al., 1996: 368).

It therefore seems likely that most of the leading firms of accountants did not pursue friendly society work by pressing for their appointment as public auditors, and the majority of those appointed to the position of public auditor were minor players on the late-19th century accounting scene. The former conclusion seems a little curious in view of the acknowledged determination of the new and vigorous accounting profession to chase after whatever work was available (Matthews et al., 1998, ch. 4). Potential explanations are: the scale of fees was considered inadequate; the *obligation* to accept the work, where offered, proved unattractive; and the reluctance of public accountants to be answerable to the Treasury. Most likely, however, appointment to the position of public auditor was considered to be unimportant. It is certainly the case that auditors could obtain much higher fees through negotiation with friendly societies in the open market. For example, the Royal Liver paid Harmood W. Banner £250 in the early 1870s (BPP 1872, xxvi, minute 22,064).[26]

The Registrar's report on friendly societies for 1876 draws attention to the fact that the audit provisions of the Friendly Societies Act of 1875 and the Industrial and Provident Societies Act of 1876 were similar, and that the same list of public auditors applied in both cases (BPP 1877, lxxvii: 8).[27] However, just 68 societies availed themselves of the services of the public auditors during 1876, and even these appointments seem often to have been motivated by societal recognition of the fact that they could not complete the annual return without first arranging for an audit to be performed. We are told that returns sent in under the name of the public auditor were of variable quality, with that prepared by E. J. Pierson,[28] one of the auditors for Warwickshire, particularly commended (BPP 1877, lxxvii: 9). The Registrar was clearly disappointed with the rate of take-up of the public auditors' services but rationalised the continuation of this experiment in the following manner.

> 'Whilst the Chief Registrar cannot but hope that the number of societies resorting to the public auditors would go on increasing, he would observe that the services rendered by these officers are not to be measured by the mere number of societies audited by them. Their very existence must tend to improve all audits of societies by establishing a standard. The mere chance that a public auditor may be called in[29] puts every auditor on his good behaviour.' (BPP 1877, lxxvii: 9)

The Registrar's report for the following year further laments the fact that the 'number of societies which avail themselves of the services of public auditors continues singularly small, and appears even to decrease' (BPP 1878, lxix: 5). The report continues its defence of the experiment by reference to the unspecified 'great good [that] is indirectly affected by the existence of these officers' (p. 6). A retrospect of progress made over the ten years since the passage of the Friendly Societies Act 1875 refers, again, to the fact that expectations in connection with the appointment of the public auditor had not been fulfilled:

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[24] The figures in Table C reflect a policy of relating the number of appointments to the number of societies within the district. For example, one public auditor was appointed where the number of societies within the district did not exceed 650, rising to six for Lancashire where there were estimated to be 2,850 societies. In 1876, there remained 13 vacancies in England and Wales, six in Scotland and one in Ireland.

[25] It is likely that Harper's *Directory* was compiled from trade directories and it certainly includes many entries in addition to the memberships of the then existing accounting associations, including the Society of Accountants in England of which Harper, who practised at 2 Cowper's Court, Cornhill, and in Maidstone, was a member.

[26] The Registrar's report of 1875 refers also to the following interesting provision: 'The auditors of the local government board are authorised to exercise subject to the sanction of that board previously obtained the functions of public auditors in their respective districts, but are not bound to accept any accounts for audit.' (BPP 1876, lxix: 12).

[27] The Registrar's report for 1876 tells us that the Industrial and Provident Societies Act, 1876, caused industrial and provident societies to be treated, for most purposes, in the same way as friendly societies. Consequently, the standardised forms of annual return produced for industrial and provident societies on 21 October 1876 followed as closely as possible the regulations previously issued under the Friendly Societies Act 1875 (BPP 1877, lxxvii: 39).

[28] Despite two mis-spellings, this is almost certainly intended as a reference to Edward Thomas Peirson who appears in a list of 'Public Auditors of Friendly Societies in England and Wales' reproduced in *The Accountant* (9 April 1881: 5) and shown as working from 46 Jordan Well, Coventry. Further, the Report of the Chief Registrar of Friendly Societies, 1875, tells us that Pierson (sic), one of three public auditors appointed for Warwickshire, was in fact located in Coventry (BPP 1876, lxix: Appendix C). This 'particularly commended' public auditor had been admitted to the Society of Accountants in England in 1872 and was a founder member and council member of the ICAEW when formed by merger of the five existing associations in 1880.

[29] This is presumably a reference to the appointment of public auditors to undertake either of the inspections detailed in footnote 32, below.

> 'With respect to the public auditors, their services are so seldom called in that unless other functions can be added to their present ones (see note: 8[30]), they might safely be dispensed with. The experiment of their appointment has been a useful one, both negatively, as proving that societies are thoroughly wedded to what may be called the domestic system of audit,[31] and that nothing short of compulsion will ever induce them to depart from it, but positively also, as having placed the Registry Office in relation with a certain number of gentlemen in provincial towns whose services have been found very useful for the purpose of inspections[32] under the Acts.' (BPP 1886, lxi: 6)

An article in *The Times*, 24 December 1877, attributes the low number of appointments of public auditors by mutual associations to a lack of awareness of their existence. The writer poured scorn on the arrangements that continued to be made by some societies, including the case of:

> '...a clergyman, sole auditor to a society without treasurer or trustee, [who] sent in a return, including a balance-sheet, only filled up as respects the assets, and with a note written on it showing that he had not the most remote conception of what a Friendly Society's balance-sheet meant.' (quoted in *The Accountant*, 12 January 1878: 11)

The public auditors made a determined attempt to raise their profile. The Association of Public Auditors[33] had been formed by 10 February 1882 when a petition was presented to the Lords of the Treasury. In the petitioners' view:

> 'The reluctance to employ public auditors arises, in the opinion of your memorialists, mainly from an undue feeling of jealousy entertained with regard to submitting the affairs of Friendly Societies to the investigation of outside parties; so advantage is taken of the option which allows them to employ their own members instead of public auditors.' ('Public auditors under the Friendly Societies Acts', 1882: 11)

The petitioners therefore suggested the following: that the appointment of public auditors should be made permanent instead of for one year; that the Registrar should employ only public auditors to investigate unsatisfactory returns; and that societies should be informed of the names of public auditors available for appointment, the nature of their duties and the amount of their fees. The decision of the Treasury to accede only to the third of these requests was enthusiastically endorsed by 'FWP', presumably the leading chartered accountant Francis W. Pixley, who looked forward to a further Friendly Societies Act that would 'cancel the appointment of public auditors, and substitute the members of the Institute of Chartered Accountants in England and Wales.' (FWP, 1882: 5)

The Registrar's report for 1891 reveals that, of the 61 public auditors appointed for the year to 30 June 1891, 17 were not employed by a single society and 44 were employed altogether by 131 friendly societies and an exactly equal number of industrial and provident societies. He continues:

> 'Notwithstanding the moderate scale of fees by which the services of persons possessed of such qualifications as the Lords of the Treasury require in the case of a public auditor can be obtained, it appears, therefore, that only 7 friendly societies out of every 1,000 employed them.
>
> 'With regard to industrial and provident societies the proportion is larger, being 11 in every 100; but the force of this consideration is much weakened when it appears that 93 out of the 131 audits were entrusted to 3 out of the 61 public auditors.' (BPP 1892, lxxiii: 23)

The Registrar recognised the possibility that even these figures might overstate the impact of the legislation: 'These gentlemen were recommended for appointment as public auditors by the representatives of the societies themselves, and are persons whom the societies would probably employ in any case, whether they held the appointment of public auditor or not.' (BPP 1892, lxxiii: 23)

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[30] This explores the possibility of achieving greater centralised control through the Chief Registrar using public auditors 'to look after the working of societies in their districts, were it only for the purpose of getting in returns and valuations, and supplying information as to the existence of societies'.

[31] This refers to the menbers' audit arranged as the result of appointing such auditors 'as the rules of the society provide' (The Friendly Societies Act 1875, s. 14(1)(c)).

[32] This refers to inspectors appointed under section 23, in response to an application from the members, 'to examine into the affairs of such society, and to report thereon, who may require the production of all or any of the books and documents of the society, and may examine on oath its officers, members, agents and servants in relation to its business'. In a similar vein, section 25(8)(a) authorised the Registrar to appoint 'any actuary or public auditor' to investigate the affairs of a society in dissolution where there was an insufficiency of funds.

[33] We have failed to find any other references to this body and assume it to have been an ad hoc lobbying alliance rather than an aspiring professional body.

## 5. Select Committee 1888

A Select Committee was appointed in 1888 and reappointed in 1889 to enquire into and report upon the operation of section 30 of the Friendly Societies Act, 1875

> '...as amended by subsequent Acts, and into the organisation or general condition of Societies and Companies to which the said Section applies, and to suggest what amendment of the Law (if any) is required to ensure the better management of such Societies and Companies, and the more complete protection of the interests of their members.' (BPP 1888, xii: ii)[34]

The provisions of section 30 applied only to friendly societies and industrial assurance companies[35] that received contributions by means of collectors at a distance greater than 10 miles from the registered office or main place of business (BPP 1889, x: v). In the case of these larger organisations, encompassed by the description 'collecting societies', the annual return had to be 'certified by some person not an officer of the society (otherwise than as auditor thereof), *carrying on publicly the business of an accountant*' (s. 30(9), emphasis added). If, therefore, the auditor of the society was an accountant in public practice, he could do both jobs. The convenience of such an arrangement may well have provided an important incentive for these organisations, though small in number, to employ a professional as auditor.

Proper compliance with the provisions of section 30(9) was clearly conditional on the meaning of the term 'public accountant'.[36] Not surprisingly, the Registrar of Friendly Societies was periodically invited to comment on this provision, and he expressed the following view: 'It would seem that the turning point of the definition in the act lies in the word "publicly", and, therefore, that many men who possess excellent credentials as accountants in private employ, or in positions where the public cannot come to them and give their accountancy work to, are not within it. To put the matter in familiar terms, the essential part of the qualification is a brass plate or other public notification that the business of an accountant is carried on.' (quoted in Pixley, 1896: 10–11)[37]

The Select Committee saw an important distinction between friendly societies, in general, and the collecting societies, with the former described as 'promoted and conducted for benefit of members' and the latter 'promoted and conducted for benefit of managers' (BPP 1889, x: v). The collecting societies were a small proportion of the totality of friendly societies, in number just 52 out of over 25,000 (BPP 1889, x: vi), but they accounted for one-third of the total funds and one-half of the total members. In turn, the collecting societies' own affairs were dominated (90% of the whole membership and 88% of the funds) by the Royal Liver Friendly Society, the Liverpool Victoria and Legal Friendly Society, the Royal London Friendly Society and the Blackburn Philanthropic Burial Society. Given the perceived orientation of collecting societies as institutions promoted and conducted for the benefit of the managers, the proper control of management expenses and the role of the audit in ensuring that such details were correctly reported in the annual return naturally occupied much of the Select Committee's attention.

We see calls for the engagement of the self-appointed elite grouping of professional accountants—the chartered accountants[38]—to report on the affairs of friendly societies. In evidence presented to the Select Committee, William Sutton, actuary to the Registry of Friendly Societies, forcefully advocated the appointment of chartered accountants as auditors and continued: 'Taking the case of societies coming to grief, through fraud, that have come before me in the last twelve or thirteen years, I should say, in almost every one, the fraud would have been detected and exposed long before it had been detected or exposed had there been a real audit.' (minute 127)

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[34] The first report (1888) contains evidence taken from just five witnesses, while the second report (1889) contains the full report of the Select Committee together with evidence from 21 witnesses.

[35] These are industrial assurance companies as defined by the Life Assurance Act 1870. Such companies are outside the scope of this paper.

[36] The term 'public accountant' has ancient origins. It was initially applied to government officials who either received monies from the 'public' to be paid into the Exchequer or received 'public' monies out of the Exchequer by way of imprest and upon account (BPP 1868–9, xxxv: 331). By the end of the 18th century, the term was also used by persons offering accounting services to the general public (Binnie and Manning, 1938: 5; Brown, 1905: 234).

[37] The development of an acceptable definition continued to prove elusive. Efforts by the emerging accounting profession to obtain a monopoly over the provision of accounting services from the late-nineteenth century onwards often foundered on the difficulty of defining precisely what was meant by the term public accountant (for example, Departmental Committee, 1936: 17–21). As late as 1961, the official history of the Society of Incorporated Accountants was doubtful whether it should attempt a 'definition of what the combined wisdom of the profession has been unable to reach with certainty'. The following exposition was nevertheless produced: 'a public accountant (or his firm) maintains his own office and staff for the purpose of professional practice in accountancy (either on his own account or as a partner in a firm): he represents himself to the public with whom he is likely to come into contact and to his clients as offering a skilled service in accountancy matters with the implication of high personal probity and the observance of commonly recognised professional standards and conduct' (Garrett, 1961: 6).

[38] The accoountancy bodies formed by this time are listed in Parker (1986: 15). Of these, the ICAEW, the three Scottish societies (in Edinburgh, Glasgow and Aberdeen) and the Institute of Chartered Accountants in Ireland possessed chartered status.

Support for restricting appointments as public auditor to the rather larger group of 'qualified'[39] accountants was provided by, among others, John Tunstall, member of the Liverpool United Legal Friendly Society (minute 4,420) and William Procter, manager of the Refuge Assurance Society (minute 6,587). It is noteworthy that each of the four leading collecting societies had arranged for the voluntary appointment of professional accountants as auditors by this time (BPP 1888, xii, minute 209).

The need to distinguish between the member and manager oriented society was also alluded to in evidence presented by the Registrar of Friendly Societies, J. M. Ludlow, barrister-in-law of Lincoln's Inn.[40] He reminded the committee that he had no power to insist upon accounts being audited in any particular way nor upon public auditors being appointed (minute 6,810–11). Further: 'I think it would be very dangerous if my office were allowed generally to appoint public auditors to audit the accounts of societies; in fact it would create a revolution.' (minute 6,813) The questioning continued:

> 'You stated just now that the appointment of public auditors by your office would be very dangerous; did you mean by that that it would diminish self-reliance on the part of societies?—I think if you gave my office power to appoint a public auditor to audit the accounts of any society it thought fit, there would be a revolution amongst the Odd Fellows and the Foresters, and all the self-governed societies.' (minute 6,827)[41]

Ludlow does, however, accept that it would not be unreasonable to impose on the Registrar the obligation to appoint a public auditor for the purpose of societies covered by section 30.

Having heard the evidence, the Select Committee recommended introduction of the following provisions for collecting friendly societies and industrial assurance companies:

> 'In lieu of section 30, sub-section (9), of the said Act, it shall be enacted that the annual returns to be made in such form as the 'Central Office' may from time to time prescribe, and shall be signed by two accountants as auditors, one of whom shall be a Fellow of the Institute of Chartered Accountants, or a chartered accountant in Scotland as now recognised, approved for the purpose by the "Central Office"; a list of such accountants approved by the "Central Office" to be printed and circulated periodically.' (p. xv)

These recommendations did not produce any dramatic revision of the legislation applying to mutual associations. Collecting societies were allocated their own Act of Parliament in 1896 (Collecting Societies and Industrial Assurance Companies Act 1896, 59 & 60 Vict., c. 26). This enactment continued, as section 6(2), but did not add to, the 1875 requirement for their annual returns to be certified by some person 'carrying on publicly the business of an accountant'. The choice between the public auditor and 'two or more persons appointed as the rules of the society or branch provide' continued for other friendly societies (Friendly Societies Act 1896, 59 & 60 Vict., c. 25, s. 26) and for industrial and provident societies (Industrial and Provident Societies Act 1893, 56 & 57 Vict., c. 39, s. 13). The audit requirements applying to building societies were strengthened by the Building Societies Act 1894 (57 & 58 Vict., c. 67, s. 3) which stated that 'one at least of the auditors of the society shall be a person who publicly carries on the business of an accountant'.

## 6. Concluding remarks

In this final section, we contrast Parliament's decision to make provision for the engagement of public accountants in the mutual societies' legislation with the statutory arrangements put in place for joint stock companies during the 19th century. We acknowledge state recognition of accountants as a skilled occupational group and consider why Parliament failed to take the further step recommended and specify the appointment of a chartered accountant to audit at least the larger societies.

The growth of the joint stock company up to the year 1844 was retarded by doubts concerning its legality in the absence of incorporation which could be achieved, in the main, only through the costly mechanisms of a royal charter or a private act of parliament. The Joint Stock Companies Act 1844 created the registered company, while the Companies Clauses Consolidation Act of the following year facilitated the formation of statutory companies by listing model clauses for their adoption. The remainder of the nineteenth century was marked by various initiatives designed to improve the level of accountability required from the rapidly expanding number of shareholder-financed companies usually benefiting from the privilege of limited liability. We have seen that the Companies Acts of 1845 and 1856 made provision for shareholders to enlist expert services from an accountant and, following business failure, an external audit was introduced for railways in 1867 and banks in 1879.

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[39] This assembly included also the Society of Accountants and Auditors (renamed the Society of Incorporated Accountants and Auditors in 1908 and the Society of Incorporated Accountants in 1954, Garrett, 1961: 1–2) and the Corporate Treasurers' and Accountants' Institute.

[40] He also held the official post of Barrister under the Savings Bank Act.

[41] The leading social historian Harold Perkin has drawn attention to the fact that there were to be found within 'the lodges of the great affiliated orders with their splendid names—the Oddfellows, Foresters, Druids, Ancient Shepherds, Rechabites, and so on—good fellowship, conviviality, and a sense of belonging to a secret and powerful freemasonry' (1969: 382). This characterisation is consistent with the Registrar's conviction that such organisations jealously guarded their right of self-government.

In the legislation designed to ensure better accountability from joint stock companies, little recognition was given to the availability of services provided by an 'accountant', there were no explicit requirements whatsoever for the engagement of an accountant, the label 'public accountant' featured not at all. This represents a significant contrast with the provisions relating to mutual associations elucidated above, where references to 'public auditor' and to persons 'carrying on publicly the business of an accountant' featured prominently in the legislation. We might therefore suggest, though this is a matter for further research, that the nineteenth century political philosophy of laissez-faire[42] was modified in the case of mutual associations in the endeavour to provide a measure of protection for individuals who were deemed less capable of looking after their own interests than were company shareholders.

This paper has demonstrated the introduction of innovative statutory audit provisions for friendly and other societies but, as often appears to have been the case in Britain, the market played the major part in creating the mechanism for accountability eventually put in place. Jones (1904: 132) has shown that less than 1% of registered societies had their accounts checked by public auditors at the beginning of the twentieth century, and this observation produced the conclusion that statutory empowerment '[had] not, rightly or wrongly, been regarded by friendly societies generally as of much value.' Quite possibly Jones obtained his figures from the Registrar's reports which did not encompass professional accountants outside the approved list of public auditors, who were voluntarily appointed by, usually the larger, societies. Jones' estimate is likely to have approximated the true position, however, and it would therefore seem that not more than 1% or 2% of mutual societies were subject to a professional audit. In view of the small size of the vast majority of them, we may conclude that the market successfully rejected pressures from various sources to appoint professionals in circumstances where, as argued by Stanesby, the members could do an adequate job. By way of contrast, there were acknowledged grounds for concern that the larger collection societies were 'promoted and conducted for benefit of managers' rather than members. To help counter the perceived greater risk of conflict between the interests of principal and agent, an obligation to engage a professional accountant to certify published financial statements was therefore imposed.

The introduction to this paper drew attention to the fact that the Bankruptcy Act 1831 signalled parliamentary recognition of accountants, along with merchants, brokers 'or persons who are or have been engaged in trades in the Cities of *London* or *Westminster*' (1 & 2 Will. 4, c. 56, s. 22), as eligible for appointment by the Lord Chancellor to serve as official assignees in the administration of a bankrupt's affairs. The following 40 or so years saw the formation in Scotland and England of associations designed to organise accountants and help elevate their perceived status within the public domain. There are early signs, within the mutual society legislation and the discourse surrounding its creation and development, that such bodies succeeded in creating an image of the accountant as possessing the following attributes identified by Atkinson and Delamont (1990: 96), namely 'disinterested, universalistic, altruistic'. We might therefore conclude that the public accountant was seen to be the man[43] entitled to parliamentary recognition 'not merely because of his technical competence but because of his social and moral rectitude' (Murray et al., 1983: 199).

The mutual society legislation gave recognition to the public accountant as expert auditor but did not go the further step and specify, as recommended by the 1888 Select Committee, the appointment of a qualified or, more restrictively, a chartered accountant to undertake such work. The single, significant, additional regulatory requirement subsequently put in place subjected the affairs of building societies to audit by a public accountant, thereby bringing them broadly in line with the other category of larger mutual association—the collecting society.

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[42] The question whether the nineteenth century can be correctly described as a period of laissez faire has been the subject of vigorous historical debate. Drawing a distinction between 'crude' and 'refined' laissez-faire, however, Crouch (1967) has made a persuasive case for the idea that increased state intervention, in certain areas, can be reconciled with the teachings of the classical economists that the legislators and burueaucrats have been thought to follow. Parker (1990) has drawn on this analysis to explain the introduction of accounting and audit regulations for British railways, public utilities and banks in the second half of the nineteenth century. The significance of the laissez-faire philosophy for the formulation of accounting legislation applied to nineteenth century business entities has recently been debated by Jones and Aiken (1995) and Walker (1996).

[43] Among the leading accounting associations, the Society of Incorporated Accountants and Auditors was the first to open its doors to women, in 1918. In the following year, immediately following passage of the Sex Discrimination (Removal) Act of 1919, Miss Harris Smith, who had been in practice as a public accountant since 1878, was admitted to the ICAEW and became 'the first and [then] only woman chartered accountant in the world' (Howitt, 1966: 65).

The failure to impose what some perceived to be more stringent audit requirements occurred despite continuing evidence of frauds such as those perpetrated at the Portsea Island Building Society and at the Liberator Building Society.[44] One possible explanation for the failure to require the engagement of a chartered accountant is that the issue became too sensitive as the result of the registration debate that raged between competing professional accounting bodies in the 1890s (Stacey, 1954; Macdonald, 1985, 1995).[45] Paradoxically, the reference in the 1888 Select Committee's report to the creation of a list of chartered accountants 'approved by the "Central Office"' may itself have been a factor in encouraging professional associations to press for state recognition in the decade that followed.

The lobby in favour of the appointment of a chartered accountant to audit mutual societies remained active. Echoing Pixley's comments of 1882, it might be seen as a further endeavour to drum up work for chartered accountants that Dicksee,[46] having drawn attention to the fact that it was the usual practice under the Building Societies Act 1874 for the directors to appoint one auditor and the shareholders the other, continued: 'In many cases, however, Chartered Accountants were not appointed, and it is probable that most of the disasters are attributable to this circumstance.' (1900: 141) The Building Societies Act 1894 is judged to have improved matters and 'In the majority of cases the Auditors so appointed have been Chartered Accountants, but it will be seen that this is still not required by the statute; moreover the wording of the section is so vague that cases still exist of accounts not being audited by *bona fide* public accountants at all.' (1900: 141)[47]

It has been noted that the appointment of a chartered accountant as auditor was not, of course, a guarantee against fraud and irregularity. At the Liberator Building Society, for example, the directors' auditor was William Theobald, a founder member of the ICAEW, who was also the auditor of London and General Bank from its start to its failure (*The Accountant*, 10 June, 1893: 47).[48] The decision not to insist on the appointment of chartered accountants as auditors in statutes regulating the affiars of friendly societies, at this stage, may possibly be attributed to the lack of a clear conviction that such individuals would do a better job.

## 7. Postscript

Statutory provision has usually followed market developments in relation to accountability by organisational entities in Britain. The 19th century experimentation with the concept of the public auditor and the requirement for the annual return of a collecting society to be certified by a person 'carrying on publicly the business of an accountant', therefore, are notable exceptions to the common sequence of events. We might therefore surmise that the decision, made in 1920, that only chartered accountants and members of the Society of Incorporated Accountants and Auditors should be eligible for new appointments as public auditor reflected a significant move towards the appointment of professional accountants to that post during the intervening period (Departmental Committee, 1936: 10).

By 1930, the number of public auditors appointed by H. M. Treasury on the recommendation of the Chief Registrar of Friendly Societies totalled about 1,050, with about 30 new appointments made each year. It was not until the passage of the Companies Act 1948 (11 & 12 Geo. 6, c. 38, s. 161) that the requirement was introduced for all registered companies to be subject to a professional audit. In the same year the Industrial Assurance and Friendly Societies Act 1948 (11 & 12 Geo. 6, c. 39) provided that reference to 'an approved auditor' shall be substituted for any reference to 'a public auditor' in the Friendly Societies Acts 1896 to 1929, the Industrial Assurance Acts 1923 to 1929, the Industrial and Provident Societies Acts 1893 to 1928, and the Superannuation and other trust funds (interpretation) regulations, 1928 (section 20(1)). Section 20(2) defined the 'approved auditor' as a member of one or more of the following seven leading professional bodies: the ICAEW; the Society of Incorporated Accountants and Auditors; the Society of Accountants in Edinburgh; the Institute of Accountants and Actuaries in Glasgow; the Society of Accountants in Aberdeen; the Association of Certified and Corporate Accountants; the Institute of Chartered Accountants in Ireland.[49]

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[44] In *re The Liberator Permanent Building Society*, City of London Court, *The Accountant Law Reports*, June 10, 1893: 73–76; June 17, 1893: 80; June 24, 1893: 82–4. *Reg. v. Townsend & Others* (The Portsea Island Building Society), Queen's Bench Division, *The Accountant Law Reports*, June 24, 1893: 84; July 1, 1893: 89–92.

[45] Macdonald refers to the 'long battle to obtain state registration of accountants, by introducing legislation into Parliament' (1995: 199). The battle is judged to have been lost, however, because of 'the internecine quarrels' between the large number of accountancy societies that had grown up over the years (Macdonald, 1985: 546).

[46] It is somewhat ironical that Dicksee's conviction of the need for a professional audit of building societies may have stemmed from the discovery in 1890 of a major fraud perpetrated at the Cardiff Building Society, of which the firm Price and Dicksee was auditor (Kitchen and Parker, 1980: 55).

[47] Dicksee is here referring to the distinction that he draws between public accountants who are and those who are not members of a reputable professional accounting body.

[48] Both companies were under the control of the prominent Nonconformist, Jabez Balfour. The London and General was the first to fail and this led to the withdrawal of funds from the Liberator and the inevitable collapse of a company which had mortgaged assets of £3,423,000 of which more than £3m. had been loaned to Balfour's other companies (Gosden, 1973: 172–3). *re London and General Bank (no. 2)* (1985, 2 ch. 677) became one of the classic cases on the objectives and scope of the company audit and method of financial reporting (Chandler et al., 1993: 449).

## References

### *Primary sources*

BPP 1844. First report of the Select Committee on Joint Stock Companies; together with minutes of evidence, appendix and index, BPP 1844, vii.

BPP 1868–9, xxxv, 810. Public income and expenditure. Gross accounts of the UK, 29 July 1869.

BPP 1871. First report of the commissioners appointed to enquire into the Friendly and Benefit Building Societies; together with minutes of evidence, appendix and index, BPP 1871, xxv, 1.

BPP 1872. Second report of the commissioners appointed to enquire into Friendly and Benefit Building Societies, BPP 1872, xxvi, 1.

BPP 1874. Fourth report of the commissioners appointed to enquire into the Friendly and Benefit Building Societies, BPP 1874, xxiii, part 1, 1.

BPP 1876. Report of Chief Registrar of Friendly Societies, 1875, BPP 1876, 1xix, 147.

BPP 1877. Report of the Chief Registrar of Friendly Societies, 1876, BPP 1877, 1xxvii, 103.

BPP 1878. Report of the Chief Registrar of Friendly Societies, 1877, BPP 1878, 1xix, 3.

BPP 1886. Report of the Chief Registrar of Friendly Societies, 1885, BPP 1886, lxi, 1.

BPP 1888. Report from the Select Committee on Friendly Societies; together with proceedings of the committee, minutes of evidence, and appendix, BPP 1888, xii, 119.

BPP 1889. Report from the Select Committee on Friendly Societies Act, 1875, together with the proceedings of the committee, minutes of evidence and appendix, BPP 1889, x, 413.

BPP 1892. Report of the Chief Registrar of Friendly Societies, 1891, BPP 1892, 1xxiii. 233.

BPP 1894. Report of the Chief Registrar of Friendly Societies, 1893, BPP 1894, 1xix, 1.

Departmental Committee appointed by the Board of Trade on the *Registration of Accountants*, 1930, Cmnd. 3645 (1936).

Statutes, various

### *Secondary sources*

Ashton, T. S. (1948). *The Industrial Revolution 1760–1830.* London, New York & Toronto: Oxford University Press.

Ashworth, H. (1980). *The Building Society Story.* London: Franey.

Atkinson, P. and Delamont, S. (1990). 'Professions and powerlessness: female marginality in the learned occupations'. *Sociological Review*, 38: 90–110.

Beaver, W. H. (1981). *Financial Reporting: an Accounting Revolution.* Englewood Cliffs, NJ: Prentice-Hall.

Bellman, Sir H. (1935). *The Thrifty Three Million. A Study of the Building Society Movement and the Story of the Abbey Road Society.* London: [The Society].

Binnie, A. and Manning, B. (1938). *The Techniques and Principles of Auditing.* London: Pitman.

Brown, R. (ed.) (1905). *A History of Accounting and Accountants.* Edinburgh: T. C. & E. C. Jack.

Bywater, M. F. (1985). 'William Quilter (1808–88), Accountant', in Jeremy, D. J. (ed.) *Dictionary of Business Biography*, vol. 4. London: Butterworths.

Chandler, R. A., Edwards, J. R. and Anderson, M. (1993). 'Changing perceptions of the role of the company auditor, 1840–1940'. *Accounting and Business Research*, 26 (Autumn): 443–59.

Chandler, R. and Edwards, J. R. (1996). 'Recurring issues in auditing: back to the future?' *Accounting, Auditing and Accountability Journal*, 9 (2): 4–29.

Chappenden, W. J. (1966). *Handbook to the Industrial and Provident Societies Act, 1965.* Manchester Co-operative Union Ltd.

Crouch, R. L. (1967). 'Laissez-faire in nineteenth century Britain: myth or reality'. *Manchester School*, September: 199–215.

Davenport-Hines, R. P. T. (1985). 'Sir John Sutherland Harmood-Banner (1847–1927). Accountant and Steel Manufacturer', in Jeremy, D. J. (ed.) *Dictionary of Business Biography*, vol. 2. London: Butterworths.

Dicksee, L. R. (1900). *Auditing: a Practical Manual for Auditors.* Fourth edition. London: Gee.

Edwards, J. R. (ed.) (1986). *Legal Regulation of British Company Accounts 1836–1900, Volume I & II.* London and New York: Garland Publishing.

Flint, D. (1971). 'The role of the auditor in modern society: an exploratory essay'. *Accounting and Business Research*, 1 (Autumn): 287–293.

F. W. P. (1882). 'Public auditors under the Friendly Societies Acts'. *Accountant*, 25 March: 5.

Garrett, A. A. (1961). *History of the Society of Incorporated Accountants 1885–1957.* Oxford: University Press.

Gosden, H. J. H. (1961). *The Friendly Societies in England 1815–1875.* Manchester: The University Press.

Gosden, H. J. H. (1973). *Self-help, Voluntary Associations in the Nineteenth Century.* London: Batsford.

Grant-Smith, W. C. (1903). *Building Societies' Accounts.* London: Gee.

Harper, A. C. (ed.) (1877). *The Accountants' Directory for 1877.* London: Williams and Strachan.

Howitt, Sir H. (1966). *The History of the Institute of Chartered Accountants in England and Wales 1880–1965, and of its founder accountancy bodies 1870–1880.* London: Heinemann.

ICAEW (1881). *The Institute of Chartered Accountants in England and Wales, List of Members and Charter of Incorporation.* London: Good.

*Corporate Reporting*. Nelson: Sunbury-on-Thames, pp. 153–63.

Lee, T. A. (1982). *Company Auditing*, 2nd edition. London: Gee.

Macdonald, K. M. (1985). 'Professional formation: social closure and occupational registration', *Sociology, 19 (4): 541–56*

Macdonald, K. M. (1995). *The Sociology of the Professions*. London: Sage.

Matthews, D., Anderson, M. and Edwards, J. R. (1998). *The Priesthood of Industry. The Rise of the Professional Accountant in British Management*. Oxford: Oxford University Press.

Murray, T., Dingwall, R. and Eekelaar, J. (1983). 'Professionals in bureaucracies', in Dingwall, R. and Lewis, P. (eds.) *Sociology of the Professions*. London: Macmillan.

Parker, R. H. (1986). *The Development of the Accountancy Profession in Britain to the Early Twentieth Century*. The Academy of Accounting Historians.

Parker, R. H. (1990). 'Regulating British corporate financial reporting in the late nineteenth century'. *Accounting, Business and Financial History*, 1 (1): 51–71.

Perkin, H. (1969). *The Origins of Modern English Society 1780–1880*. London and New York: Routledge and Kegan Paul.

Pixley, F. W. (1896). *Auditors: Their Duties and Responsibilities Under the Companies Acts and Other Acts of Parliament*, 7th edition. London: Henry Good.

Price, S. J. (1958). *Building Societies. Their Origin and History*. London: Franey.

Robb, G. (1992). *White Collar Crime in Modern England: Financial Fraud and Business Morality, 1845–1929*. Cambridge: Cambridge University Press.

Sherard, R. H. (1906). *The Life of Oscar Wilde*. London: Werner Laurie.

Slater, G. (1935). 'The relief of the poor', in Laski, H. J., Jennings, W. I. and Robson, W. A. (eds.) *A Century of Municipal Progess 1835–1935*. Allen and Unwin, 1935 (reprinted by Greenwood Press, Westport, Connecticut, 1978) pp. 332–69.

Sprague, T. B. (1874). *A Treatise on Life Insurance Accounts*. London: the author.

Stacey, N. A. H. (1954). *English Accountancy: A Study in Social and Economic History 1800–1954*. London: Gee.

Stanesby, J. T. (1875). *Auditors and Auditing Considered in Relation to Building Societies*. London: Reed.

Walker, S. P. (1996). 'Laissez-faire, collectivism and companies legislation in nineteenth century Britain'. *British Accounting Review*, 28 (4): 305–24.

Wallace, W. A. (1980). *The Economic Role of the Audit in Free and Regulated Markets*. New York: The University of Rochester.

Watts, R. L. (1977). 'Corporate financial statements: a product of the market and political process'. *Australian Journal of Management*, April: 53–75.

Watts, R. L. and Zimmerman, J. L. (1986). *Positive Accounting Theory*. London: Prentice-Hall.

Whittington, G. (1987). 'Positive accounting: a review article'. *Accounting and Business Research*, 17 (Autumn): 327–36.

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# TQM adoption, institutionalism and changes in management accounting systems: a case study

**Zahirul Hoque and Manzurul Alam***

**Abstract**—In recent years many organisations have moved towards a total quality management (TQM) path in their quest for quality. Accounting researchers have become interested in understanding how accounting systems are implicated within a TQM environment. This paper reports on a case study of TQM adoption and changes in management accounting systems (MAS) within a New Zealand construction company. It evaluates organisational approaches to implement TQM as a strategic option and the subsequent change in MAS. The paper suggests that an organisation may initiate TQM practices to promote 'institutional' and 'quality' culture rather than for purely technical reasons. It also suggests that when an organisation adopts new management practices such as TQM, it may lead to changes in the organisation's internal control mechanisms, such as management accounting and reporting processes.

## 1. Introduction

In recent years many organisations have moved towards a total quality management (TQM) path in their quest for quality. TQM is seen, for purposes of this study, as a set of concepts and tools that focus on individuals, groups and organisations for continuous performance improvement (Kanji, 1996; Mehra, Sirias and Hoffman, 1998). There is growing empirical evidence emerging from the literature that organisations that pursue TQM achieve better employee relations, higher productivity, greater customer loyalty, increased market share and improved profitability (Boaden, 1997; Chenhall, 1997; Conti, 1993; Juran and Gryna, 1993; Shank and Govindarajan, 1994; Terziovski, et al. 1996).[1] In his 'Relevance regained, total quality management and the role of management accounting' paper (1994:265), Johnson suggests: 'To be competitive and profitable, businesses always must understand how to lead people and satisfy customers. TQM focuses attention on the competitive power that resides in building relationships and empowering people to solve problems—specifically, problems that impede profitable satisfaction of customer wants.' (see Ezzamel, 1994 for a critical commentary on Johnson's paper)

There is growing recognition in the management accounting literature that when an organisation adopts a new management philosophy, it may lead to changes in the firm's internal accounting and control mechanisms (Chenhall, 1997; Foster, 1996; Johnson, 1994; Kaplan, 1994; Shields, 1997). An organisation's management accounting system is expected to provide timely, accurate and relevant information on performance (Foster, 1996; Horngren et al., 1994; Kaplan, 1995). Traditional management accounting systems[2] have been found to be inadequate to identify opportunities for quality improvements (Daniel et al., 1995; Fowler, 1996; Johnson, 1994; Shank and Govindarajan, 1994; Shields, 1997; Ittner et al., 1997; Swain and Denna, 1998). In their paper on 'Measuring the cost of quality: a strategic cost management

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[1] For a recent review of literature on TQM, see *Total Quality Management*: 8, Nos. 2&3, June 1997, Special Issue plus *International Journal of Applied Quality Management*: 1, No. 1, 1998.

[2] For recent discussion of the limitations of traditional management accounting systems, see the following issues of the *Journal of Cost Management*: 9 (3), Fall 1995; 9 (4), Winter 1995; and 10 (4), Winter 1997.

perspective', Shank and Govindarajan (1994:16–17) note: 'Whichever approach a firm chooses, quality is such an important strategic varaible that management accounting can no longer ignore it. One way or another, a strategically effective management reporting system must deal explicitly with the issue of quality'.

To date, little attention is given to understand how and to what extent management accounting systems (MAS) can satisfy management's needs for information that supports a quality oriented culture (Chenhall, 1997; Daniel et al., 1995; Fowler, 1996; Ittner et al., 1997; Wruck and Jensen, 1994). It is the aim of this paper to address the above gap on the relationship between TQM implementation and MAS. In order to achieve this aim, this paper addresses a number of questions: (a) Why and how the subject organisation initiated TQM programmes? (b) What are the major characteristics of TQM in the organisation? (c) To what extent do quality ideas and procedures become institutionalised? (d) What are the differences between pre-TQM MAS and post-TQM MAS in the organisation?

The remainder of this paper is organised by first detailing the conceptual framework used to understand the research issues noted above; it was derived from the literature on TQM adoption and the role of MAS therein. Next, we introduce the quality environment in New Zealand; this provides context to the paper's subsequent analysis. The research methods adopted are described in Section 4. The research results are further presented in Section 5. This is followed by a discussion of the results in terms of implications for further research.

## 2. Theoretical basis

TQM is a management tool for continuous improvement. 'Improvement' is measured in terms of providing products or services of high quality and low-cost (Boaden, 1997; Greene, 1993, 1995; Juran, 1993; Ross, 1993). TQM culture is characterised by four key principles: (1) continuous focus on the customers; (2) continuous improvements; (3) everybody's participation; and (4) focus on facts (Kanji and Asher, 1993; Kanji, 1997). Advocates of TQM claim that these four principles are all very important because they have to support each other to enable the organisation to be creative, competitive and profitable. Nevertheless, this claim is controversial. Although many, including Johnson (1994) and Cooper (1996), praise TQM, others (e.g. Ezzamel, 1994; Riahi-Belkaoui, 1993; Kanji, 1996) have identified significant costs and obstacles to TQM implementation.

Ezzamel's (1994) critical commentary on Johnson's (1994) thesis concerning the benefits of TQM is noteworthy. In his paper (1994), Ezzamel comments that when implementing TQM there is a tendency for management to overemphasise the use of detailed written rules and procedures, which separate the individuals from their work. It will be argued, however, in this paper that organisations may adopt management techniques such as TQM not only for functional (or technical) reasons but for other purposes such as to become isomorphic with the institutional norm (Dimaggio and Powell, 1983; Scott, 1987 and 1994).

Writers such as Robson (1982), Barney (1986a, 1986b, 1991), Hill (1991a, 1991b), Majaro (1992), Powell (1995), and Peters and Waterman (1982) argue that 'conformance to quality' has developed a culture in society where organisations can benefit by showing their commitments to quality principles. Apart from gaining competitive superiority, a commitment to quality can lead to the creation of corporate image and trade access to various markets. While it is obvious that TQM has general appeal, its meaning and importance, like other organisational processes, can only be understood in terms of its organisational context (Scapens, 1994; see also Ghobadian and Speller, 1994; and Powell, 1995).

Several authors argue that business environments along with trade practices and various regulations in a particular society can influence the behaviour of constituent organisations (Covaleski and Dirsmith, 1988; Covaleski et al., 1993; Meyer and Rowan, 1977; Meyer and Scott, 1992; March and Olsen, 1989; Scott, 1987 and 1994). These writers suggest that organisations may adopt certain systems, policies, and procedures by imitation and copy one another to demonstrate conformity with institutionalised practices. It is therefore argued in this paper that a commitment to TQM by a regulating authority, or by any leading organisation, can be followed by others and soon it may become institutionalised.

Many accounting scholars feel that changes to a firm's MAS are obligatory for TQM adoption (Cooper, 1996; Daniel et al., 1995; Ittner et al., 1997; Shank, 1995). According to Shank and Govindarajan (1994), TQM firms need a system of MAS that can meet managers' quality-related information needs. The management accounting literature implies that traditional MAS (such as standard costing systems) are more concerned with the measurement of efficiency in terms of budget attainment. This has led to claims that traditional MAS are inadequate for assessing the economic value of a given strategy or for choosing between competing strategies. Traditional MAS can be a great hindrance to implementing TQM. One example of this is the way MAS usually institutionalised waste (e.g. scrap and rework) by having 'normal allowances' for them. On the other hand, in TQM, there is no such thing as 'allowable waste' because under TQM, the emphasis is on 'continual improvement' (Shank and Govindarajan, 1994:12).

It appears that TQM requires detailed MAS information, financial as well as non-financial, for internal assessment of quality performance and ultimately results in improved organisational performance (Chenhall, 1997; Ittner et al., 1997; Johnson, 1994; Kaplan, 1995; Shank and Govindarajan, 1994). Institutional theory implies that once these reports are prepared, for whatever reasons, organisational members may want to consider their relevance in the context of operational activity management. Such documentation, however, may be institutionalised in the organisation over time (Meyer and Rowan, 1977; Scott 1987), and form part of their organisation's culture (see Deming, 1982, 1986; Goddard et al., 1995; Hill, 1991a, 1991b; Robson, 1982; and Suver et al., 1992).

Thus, institutional theory in this study helps capture significant external 'institutional' factors such as market pressures, fierce competition, customer expectations, professional associations, public perceptions, regulatory factors (e.g. legislation, guidelines, quality standards, etc.) influencing TQM adoption and the change in MAS. The literature on the relationship between TQM practices and management accounting as discussed above helps achieve a better understanding of how and to what extent management accounting, as well as management accountants, play a role in the implementation of TQM in an organisation.

Nevertheless, no research is unaffected by prior assumptions and beliefs: consequently in this study, organisations and society were assumed to be socially and institutionally constructed systems of reality (Morgan and Smircich, 1980; Chua, 1986; Hopper et al., 1987; Scapens, 1994). As Deising (1971) points out, 'The whole explanation is a description of a particular personality, social or cultural system, and no statement within the explanation needs to be generalised beyond that system.' Seen from such a perspective, a description of the organisational context is now essential. In the next section, we provide this.

## 3. Quality environment in New Zealand

Quality efforts in New Zealand (NZ) firms can be identified with the deregulation policies of the government during the mid-1980s. Before the present regime of deregulation from 1984 onwards, NZ firms were poorly prepared to adapt to the changing nature of global competition, either through upgrading production efficiency or by raising levels of innovation and quality (Champbell et al., 1989). The home market was protected from foreign competition while export trade was supported by generous tax policies, export loans and allowances (Wooding, 1987). In such a protective environment, the firms had little incentive to focus on quality as a strategic option. Quality concepts were practised in a traditional manner through developing elaborate inspection systems.

However, in the mid-1980s the NZ government embarked on creating an open market economy. The internal market was opened and trade incentive bonuses to local firms were withdrawn. The NZ firms realised that they had to compete on an equal footing with international firms. Many NZ firms have introduced a quality system by adopting ISO 9000 standards as well as TQM (Grieve, 1990; Lowe et al., 1992; McClintock, 1993). In 1997 there were over 1,200 firms in NZ certified to the ISO standards.[3] There is evidence that fiercer competition and customers' expectations with regard to quality compelled most New Zealand firms to focus on ISO certification and/or TQM adoption (Batley, 1994; Needham et al., 1997).

Quality practices are not only confined to private sector organisations. Many public sector organisations in NZ are also embracing these quality improvement processes (Grieve, 1990; Lowe et al., 1992; McClintock, 1993; Fowler, 1994; Fowler and Lord, 1995). For example, local city councils now contract out a significant amount of traditional services, such as refuse collection and roading, to private sector firms which deliver such services on behalf of the council. It was reported that to ensure quality some city councils now require tenderers to be certified by the standard authorities and to have a quality improvement programme such as TQM in place.[4] It therefore can be argued that when a provider of services has a formal quality improvement programme in place, the principal (such as city councils) may not feel the need for constant surveillance of the activities of service providers.

Furthermore, quality culture is promoted at national level in New Zealand through organisations such as the New Zealand National Quality Awards Foundation (NZNQAF) and through regular quality conferences. The Ministry of Commerce has also initiated quality awards. These awards are organised through Business Development Centres. Since their introduction in 1993, 350 organisations have applied for these awards. Certifying organisations, such as Standards New Zealand, Telarc New Zealand, KPMG Peat Marwick, Lloyd, and others, play an important role in disseminating the ISO 9000 standards and advising organisations about TQM (McClintock, 1993; Fowler, 1996).

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[3] Source: The JAS-ANZ Register of Accredited and Certified Organisations, Standard Australia, May 1997.

[4] Telephone interviews with officials of local city councils.

## 4. Research strategy and data sources

### *4.1. Choice of the case study strategy*

The principal style of investigation adopted was a *single-site study* in the qualitative case-study fashion (see Yin, 1989; Scapens, 1990; Birnberg et al., 1990 for a fuller account of this research approach). According to Yin (1989), a case-study approach has some advantages over surveys and experimental designs, when one is asking 'how' or 'why' questions while investigating a phenomenon over which the researcher has little control. The literature on research methods notes a number of forms of case studies: descriptive, illustrative, experimental, exploratory, and explanatory (for details, see Yin, 1989; Scapens, 1990; Birnberg et al., 1990).

In this paper, both 'descriptive' and 'explanatory' approaches are used in the case study analysis. First, we build up a comprehensive, descriptive picture of TQM and MAS processes in place within the organisation studied. Second, we discuss the findings using the theoretical basis outlined in Section 2. As Robert Scapens (1990:274) notes, 'Every researcher will be influenced by his/her past experience, previous research, papers read, and so on. Thus, in any case study there will be considerable prior theory, even if it is only implicit. To make the research meaningful to others, the researcher should make explicit, and as comprehensive as possible, the theory which shapes the case study.' Archer and Otley (1991), Ferriera and Merchant (1992), Otley (1994) and Hoque and Hopper (1994, 1997) provide similar views on this issue.

### *4.2. Sources of data*

The data were collected over a six-month period in two phases. A pilot study was conducted during 1995–1996 for generating issues for more in-depth investigations in the second more intensive research phase, which lasted for four months during 1996–97. The study utilised two primary techniques for data collection. These involved semi-structured interviews with 20 employees at different levels and a systematic study of documentary materials on the company's TQM and MAS practices.

The interviewees were selected from different hierarchical levels of the organisation and included: members of the board of directors, engineering staff, quality staff, accountants, project operators, and site workers and drivers. An interview schedule was prepared consisting of several questions which formed the basis of interviews. It was developed based on the literature on TQM and the role of MAS therein as noted earlier. The interview schedule was used flexibly. For example, if a subject showed especial interest in a relevant issue and wished to develop it he or she was allowed and encouraged to do so. If, on the other hand, he or she appeared uninterested or uneasy about a line of questioning it was dropped. The interviews spanned from one to three hours.

The second method for data collection was the study of archival records. Several company documents were collected, such as organisation structure, minutes of management meetings, memos, TQM manuals, accounting statements, budgetary reports, performance reports, and MIS reports. These documents supplemented the interview evidence. In addition, information was also collected from reports on the service industry from the government, management consultants associated with certification processes of quality standards, professional associations, and local city councils.

A variety of tactics to check the validity and reliability of the evidence was employed, including triangulation across data sources and methods,[5] cross-checking and referencing similar points with different interviewees, getting feedback from participants in the study, and checking out rival explanations. In general, a high degree of consistency was found.

## 5. Background to the case study

The case study was undertaken at a New Zealand-based construction firm, DTL Limited or DTL for short.[6] DTL was chosen for an in-depth investigation because it had a TQM system in place and agreed to participate in the study. DTL is an engineering construction company established in New Zealand on 28 March 1963. A single family (76% share) and six outside shareholders (24% share) own the firm. The firm offers a variety of services, such as contracting work-site work, earthmoving, roading, carport development, drainage, general cartage—specialisation in bulk cartage and cartage of earth-moving machinery—to clients throughout New Zealand. In 1996 DTL reported turnover of $10.5m and net income of $1.36m. Total assets at 30 June 1996, were $3.7m. At the time of the study the firm employed 120 full-time staff.

The managing director of DTL is also the chairperson of the company. DTL's management board has three members: the first represents accounts, administration, and quality management; the second represents engineering; and the third represents contracts and yard sales. The company is organised into four functional departments: accounts and administration; engineering; contracts and yard sales; and quality management. The organisation chart of the firm at June 1996 is shown in Figure 1.

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[5] For details on triangulation approaches, see Yin (1989) and Hoque and Hopper (1997).

[6] The actual name of the organisation is not used to preserve confidentiality as promised.

## 6. Research results

### *6.1. Inception of TQM*

The present focus on TQM implementation at DTL has both functional necessities and institutional influences. The concern with 'quality' at DTL, according to the company's managing director, started at its inception. At an early stage, DTL wanted to be known for quality in the area of Hamilton. The company was small; assurance of quality was therefore possible through top management's personal inspection. This quality assurance system became less effective when the business began to grow, especially after the deregulation of the transportation and construction markets in 1985. The construction companies began to specialise according to their core competencies. Companies like DTL found it useful to concentrate on particular aspects and to use other small companies on a contract basis for different segments of a job on which it was lacking proper expertise. Soon a relational structure was created where a single company did not perform the entire job. However, such a relational network needed a mechanism to ensure quality of performance. The head of the engineering department of DTL commented:

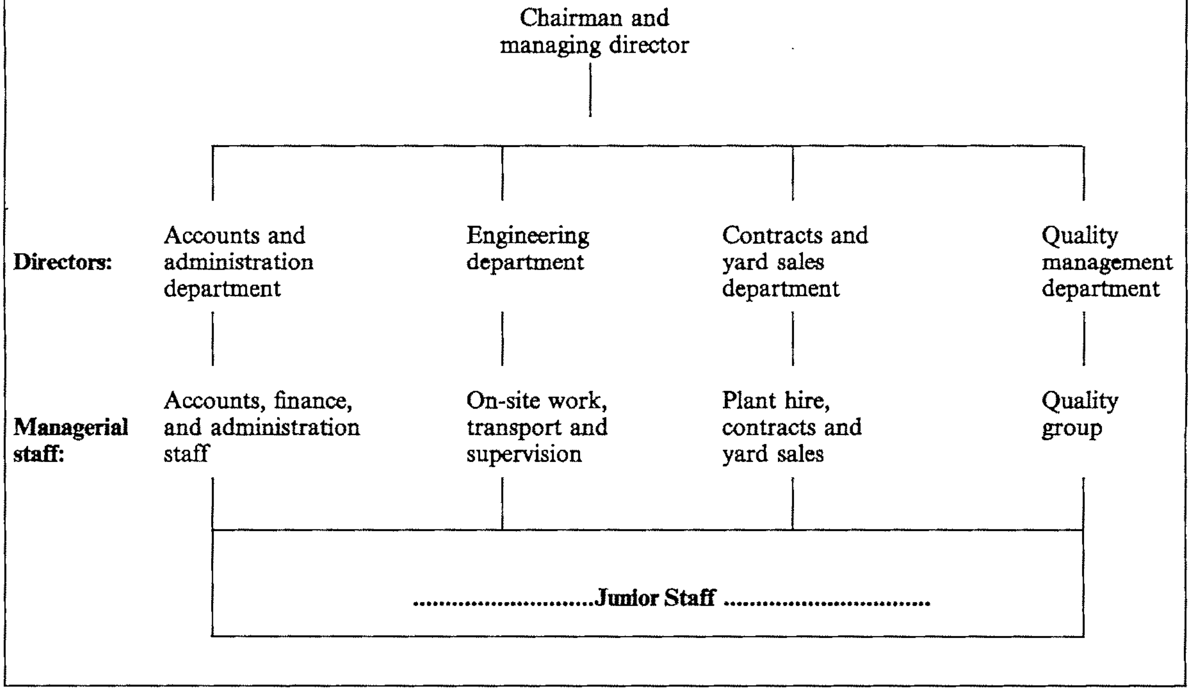
> 'As the business began to grow, we were facing problems in keeping track of different operations. Maintenance of quality became difficult at on-site operations situated in different locations. Moreover, we were using different sub-contractors to work for us. We started to lose control on operational matters unless we had a formal quality improvement programme such as TQM that could guarantee quality issues.'

Interviews with quality staff of DTL revealed that the city council, one of the major clients of the company, prefer those tenderers who have quality improvement programmes in place. DTL competes with other construction firms for contracts from city councils. As the company was committed to quality from its inception, it did not face any conceptual problems in adopting a formal quality programme. Moreover, a formal quality programme was seen as a necessary condition for successful bidding in a market where quality is also adopted by the competitors in the same industry. According to the quality co-ordinator, 'The implementation of TQM has led to an increase in the confidence of clients that DTL's service quality is consistently meeting their needs.' Another of the quality staff stated:

> 'DTL cannot afford to be the major construction and engineering firm in the market without having TQM, while most of its competitors have TQM very much in place.'

Once a successful bidding is complete, DTL uses other small construction companies for different

**Figure 1**
**Organisation chart of DTL company**


Chairman and managing director
Directors:
Accounts and administration department
Engineering department
Contracts and yard sales department
Quality management department
Managerial staff:
Accounts, finance, and administration staff
On-site work, transport and supervision
Plant hire, contracts and yard sales
Quality group
............................Junior Staff ................................

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parts of the overall project. Instead of directly supervising the sub-contracts, DTL requires these companies to have a proper quality system. Realising the fact that the ultimate responsibility for quality rests with DTL, it cannot afford but to insist a proper quality programme with junior partners. Thus, the emergence of a wider concern for quality is institutionalised and permeates with the society. For example, various national forums like the New Zealand National Quality Awards Foundation, the New Zealand Organisation for Quality and the Institute of Professional Engineers New Zealand (IPENZ), to some extent, also influenced the organisation to introduce the formal quality system within the company. A senior executive of DTL provided further confirmation:

> 'Increased demand for the implementation of continuous improvement programme underlying the TQM philosophy in the organisation also came from various national forums and organisations, such as city councils, quality award foundation, institute of engineers, etc.'

The above observations are consistent with the argument put forward by several institutional theorists who suggest that some times organisations tend to give the external appearance of having implemented a new management system in order to appear modern, rational, efficient and legitimate (Meyer and Rowan, 1977; Dimaggio and Powell, 1983; March and Olsen, 1989; Scott, 1994; see also Shields, 1997).

### 6.2. *Quality strategy and TQM adoption*

In November 1991 DTL embarked on a programme aimed at implementing the formal TQM philosophy. For this purpose, a committee was formed chaired by the Secretary of the company and consisting of all heads of functional departments (4) and representatives from site-workers (2) and trade union (1). The committee started with a process of self-questioning about the organisation and themselves: Who are the customers? What are their requirements? What is the purpose (vision and mission) of the organisation? How can the organisation satisfy customers' need? What processes need to be co-ordinated and integrated? DTL is committed to:

1. delight customers with the company's genuine efforts to innovate, provide excellence in customer service and ongoing quality improvement;
2. take advantage of new opportunities presented by new technologies;
3. continue to develop the expertise in the management team;
4. maintain an up-to-date fleet of vehicles necessary to achieve the organisational goal(s);
5. provide competent drivers, operators, and staff to satisfy customers; and
6. develop long-term relationships with the company's customers and suppliers.

To achieve these objectives, according to DTL senior managers, the company required a greatly expanded commitment to continuous improvement largely through adopting a formal TQM programme. The director of accounts elaborated:

> 'As a small economy, the New Zealand market is very competitive. So, to be profitable and to remain competitive in the market, we had to think how to lead people and satisfy customers. We believe that service quality is vitally important to retain existing customers and to gain new ones. The implementation of a company wide TQM focused on a quality of service to satisfy customers, by involving all employees on continuous improvement, therefore considered to be a vital step in the company's success.'

A senior contract manager further put it, 'It is no longer possible for DTL to say to its customers, we did the best we could with this service; we are ready to fix anything that may go wrong'. A construction engineer at DTL went on further to say, 'Quality is our strong point' and 'We do it right the first time'. The managing director of the company put it, 'Our TQM spells success', such behaviour is consistent with suggestions made in the TQM literature that under TQM, the overriding consideration is to 'build quality into the input of a process' rather than 'inspect quality into the output'. Shank and Govindarajan (1994) provided a summary of these views (see also Kanji and Asher, 1993; Kanji, 1997).

### 6.3. *TQM culture in the company*

DTL management realised the difficulties of implementing a new system like TQM. Instead of introducing the philosophy of TQM all of a sudden, as it might alienate employees, management decided to implement TQM in different sequential phases. A careful strategy was devised to relate the system with the existing one and to highlight how they can be benefited by the system. Quality initiatives within the company were encouraged from all levels of employees. Employees were organised to represent functional work groups or to include cross-functional representatives depending on the nature of the problem. Interviews with engineering and quality personnel at DTL provided evidence to support this view, revealing that contract staff members enjoy full autonomy to make day-to-day decisions within their areas. For example, the contract manager and supervisor have authority to stop any work where there are concerns regarding quality and services. Additional support for this is apparent from remarks of a contract manager:

> 'We face many problems during on-site work; sometimes we need to resolve them on an urgent basis. We are allowed and encouraged to take proper action to solve the problems on the spot. The management, however, only demands from us a proper explanation and report on the issues immediately.'

Top management reported that they organised workshops and seminars at the initial stage of TQM implementation to educate all levels of management in TQM and the impact that it may have on performance of the company. The head of the engineering department commented:

> 'Everybody in the organisation seems to have an idea of why the formal TQM was needed. Even though they could not define quality, they seem to have a clear idea what constituted a lack of quality.'

During on-site discussions most managers said that initially they were not convinced about new ways of looking at work practices. There were some who were encouraged with the opportunity to contribute to the new initiatives. Again, there were many who either did not understand the concepts or were reluctant to see such an organisational change. One manager commented:

> 'At first I hated the concept of TQM but later when I worked through the process and got involved in it, I was convinced that the system could bring some real benefits to the organisation and to my job as well.'

Another manager stated: 'The new system has increased my workload.' A construction supervisor interviewed further added: 'In addition to the normal workload, the management is now asked to put extra effort for the quality programme.' Apart from these managerial perceptions, there has been little resistance from all levels of employees to TQM implementation at DTL.

In general, most interviewees believed that since its introduction, TQM has continued to serve as fundamental to DTL's management philosophy. There have been marked increases in the number of orders placed with the firm, in the amount of construction work undertaken, in productivity and profits. This evidence is consistent with the claim that TQM is one of the keys to a firm's competitive success (see Johnson, 1994; Powell, 1995; Daniel et al., 1995). However, Ezzamel (1994) finds this argument 'hard to accept' given the plentiful evidence in his study which points in the opposite direction. Ezzamel believes that TQM's promises to achieve the 'best' results while creating and maintaining a supportive culture are significantly overstated.

### 6.4. *Changes to the company's management accounting systems*

Our field study revealed that the accounting data produced by the company's old management accounting system (MAS) supplied information on the project under the major heading of expenses rather than on specific functional areas, which created values for the project. While each project was carried out in different service processes, accounting records were only maintained for the overall project.

In January 1993 the director of accounts and administration initiated an update to their old MAS in line with TQM's premises. His 12 years of experience as accountant led to a feeling that they needed TQM-oriented accounting for relevant information for effective decision making. The new quality system required more information processing on a project basis. Such information processing helped management to concentrate on strategic issues like market developments and decentralised operational decisions to work groups.

When comparing the old (pre-TQM) MAS to new (post-TQM) MAS at DTL, several differences can be identified. Some of the more important differences follow and are summarised in Table 1.

#### 6.4.1. *Scope of information processing*

The pre-TQM MAS at DTL was largely historical and financial accounting-oriented. Emphasis was placed on providing management with aggregated financial information, such as costs, profit, leverage, revenue growth, and the like. Internal information processing for management decision making was ad-hoc and tender oriented. Tendering process starts when the company decides to compete for projects in the local market. Initially, the project leader in consultation with management accountants prepares proposals with the cost figures and technical details for the tender offer. The director of accounts elaborated:

> 'In a tender situation our main concern is to get the offer. We study our competitors and try to predict their prices and set a competitive price for our tender. Accounting figures are calculated separately for each project along with a profit margin but we adjust this according to the principle of "what will go".'

DTL's top management found it necessary to change the focus of its firm's MAS in support of TQM. Accordingly, the post-TQM MAS records and reports both financial and non-financial events of the company. Top management realised that the long-term survival of the company depended on factors like quality, customer satisfaction and op-

**Table 1**
**Comparison of pre- and post-TQM adoption MAS in the company studied**

| *Pre-TQM MAS* | *Post-TQM MAS* |
|---|---|
| Financial accounting orientation (costs, profit, ROI, revenue growth) | Orientation encompassing both financial and non-financial measures (innovation, client satisfaction, on-time completion of project etc.) |
| Calculation of aggregated cost data | Calculation of project-wise costs |
| No quality costing and management | Provision for quality costing and management |
| No linkage to strategy - short-run orientation | Linkage to strategy - long term, strategic management orientation |
| No involvement of accountants within TQM programmes | Greater involvement of accountants within TQM programmes |
| Annual feedback on performance (profit & loss statement variance) | Provision for fortnightly/monthly feedback (project/activity-wise analysis) |

erational efficiency. These factors were not recognised and reported in the previous system. 'The TQM-focused MAS assists management in the evaluation and improvement of TQM practices, and satisfies managers' information needs,' commented the firm's managing director. Many accounting writers (e.g., Albright and Roth, 1992; Johnson, 1994; Kaplan, 1994; Shank and Govindarajan, 1994; Dale, 1995) have reached similar conclusions on the role of management accounting in today's organisations.[7]

The internal management reporting process within DTL has also changed. As part of TQM practices, a quality reporting system was introduced within the company. A study of management reports and interviews with DTL managers revealed that there was no provision for formal reporting of quality costs in the pre-TQM MAS period. A quality report at DTL contains indices, such as project-wise actual versus goals, previous period comparisons, customers' opinions regarding DTL's quality of services, data on the cost of quality, and three-month forecast. Top management held the view that formal TQM within the organisation plays a vital role in enabling problem areas to be more readily identified, thereby reducing rework and streamlining internal processes. However, a number of staff at various levels expressed concerns that top management places heavy emphasis on documentation and quality reporting processes.[8] The following extracts on quality records from the firm's Business Systems Manual (p. 61) provide further confirmation:

> 'All records relating to the operation of the quality system shall be adequately maintained and stored by each department and those records must be legible, clearly traceable by date, client, and description (as appropriate), and suitably indexed and filed for easy review and retrieval. Hand-written changes to documents must be signed and dated and twinkling, erasing, or over-writing is not permitted. Where contractually specified, records shall be made available to the client for an agreed period. However, no records, in whole or in part, shall be released to any persons outside the company without prior consent of the Company Secretary.'

### 6.4.2. *Quality systems and management focus*

The pre-TQM MAS at DTL provided data mainly for preparing the annual profit and loss statement variance. Emphasis was placed on reporting variance for aggregated revenues and operating and non-operating expenses once a year. This approach, according to the company's quality managers, tended to be short-run in nature and hence not adequate and relevant to the company's quality improvement related activities. As evident in the study, DTL focuses on creating better value for the customer by providing services of high quality. As a construction industry DTL is a consumer of many materials and components produced by other manufacturing companies. The quality of output for a construction company is primarily affected by the quality of inputs, including raw materials and labour resources. For example, a supplier may be able to offer the lowest price but this may be potentially damaging if the goods are of poor quality with defective units and unreliable delivery schedules. DTL management took a number of steps to cope with these problems:

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[7] For a detailed discussion on this issue, see also Kaplan and Norton (1992 and 1996), McNair, et al. (1990), Nanni et al. (1992), Hoque et al. (1997), Ittner et al. (1997); and Chenhall (1997).

[8] The Head of TQM department believed that these were acquired by their formal TQM and certification culture.

(1) The management decided to procure materials from those firms that are ISO accredited. ISO gives an implied guarantee of the company's products (but not an explicit guarantee). The purchase manager explained, 'it is difficult to establish a long term relationship like Japanese firms, as in New Zealand most of the suppliers import materials from overseas. To ensure regular supply we have to deal with a range of suppliers.'
(2) The company involves the client in the determination of quality on a construction project.
(3) As a construction company, DTL views quality of design as very important in terms of efficiency. Questions are often asked: Are all materials and components compatible? Are these components of a reasonably consistent standard? Such a need for consistency was explained by a supervisor: 'Unlike manufacturing firms it is impossible to discard defective units, it may be necessary to work on defective units involving time, money and reputation. So we are careful on the quality of inputs and processes to provide quality outputs.'
(4) DTL introduced project management as a means of promoting project quality.

As pointed out by DTL management, the post-TQM MAS has been designed in such a way that it could help them to achieve the above various strategies of the company. Our field research revealed that the post-TQM MAS provided a variety of measures and reports (e.g. cost of quality-related activities, defect rates, returns from customers due to poor quality, warranty repair cost, rework) to assess effectiveness of the company's TQM practices. In general, quality managers expressed a high degree of satisfaction with the post-TQM MAS in the belief that the system helped them coordinate, plan and communicate the TQM related work to the best interests of the company. Other managers interviewed shared this view. This evidence is consistent with suggestions made in the literature concerning the role of management accounting in a TQM environment (see Shank and Govindarajan, 1994; Johnson, 1994; Ittner et al., 1997; Kaplan and Atkinson, 1998).

#### 6.4.3. *Involvement of accountants in TQM*

Traditionally technical people, such as construction and design engineers, dominated the company. DTL management tried to build on the prevailing culture and to focus more on customers. Technical people were de-coupled from market changes and strategic issues, and only concentrated on the project side of it. After the introduction of TQM, strategic information on market and competitors were regularly supplied and shared with the workgroups.

Apparently, under pre-TQM MAS, accountants played a limited role in the organisation. The quality manager explained the situation:

> 'Employees traditionally considered quality as a functional (engineering) responsibility rather than an organisational long-term goal. Organisational structure also separated the responsibilities for design and site management. There was hardly any communication between the groups and work groups worked independently.'

In essence, DTL management believed in the potential of greater involvement of management accountants in TQM practices. They perceived the pre-TQM MAS to be ill-suited to the TQM environment because of its failure to provide a good basis for quality improvement activities. Most interviewees believed that under post-TQM MAS management, accountants played a valuable role in helping the company achieve its goals by providing a variety of TQM-related measures and reports noted earlier in this paper.

#### 6.4.4. *Frequency of management meetings and reporting*

Within DTL, under pre-TQM MAS, there was a provision for formal management meetings twice a year in order to review and evaluate the performance of the company. Under post-TQM MAS, DTL has implemented a well-developed monitoring and reporting system. Management meetings are held now at least once every three months to discuss issues concerning quality improvement programmes, cost management, budgeting, firm performance and managerial efficiency. Monthly management meetings are also held to review matters concerning quality, safety, financial and non-financial performance and general company business. Site meetings are held largely on an informal basis; the contracts manager, or supervisor in his/her absence, is responsible at present for organising such a meeting on the site. Along with these meetings, the quality manager is responsible for convening a formal management review meeting at least twice a year, or more frequently as required, to perform a review of the effectiveness and implementation of the system. The DTL Transport Business Systems Manual (p. 5.1) stated:

> 'Formal accountability meetings shall be convened at least twice a year (or more frequently as required). The review shall normally be held during March/April and September/October each year to coincide with a review of internal audit findings and to coincide with the completion and review of the company's financial accounts.'

Responsibility for ensuring that timely corrective action is taken as a result of discussions at the review meetings is assigned to a management accountant who is also a member of the quality management group. The managing director commented:

> 'Regular accountability meetings help us review quality processes and take corrective actions, where necessary. Moreover, these meetings increase employee efficiency, motivation through interactions among staff and overall performance of the company.'

A senior quality manager further reflected:

> 'The formal structure of TQM in the company helps the company to remain competitive in the marketplace. We have a system of monitoring and recording problems that come across during our work. The manager who receives a quality related complaint from the customer is responsible for ensuring that the incident is recorded and passed on to the quality manager. The management accountant is responsible for initiating and assigning responsibility for the investigation, determining the action required, action taken, and monitoring the effectiveness of the corrective action taken.'

Certainly, the pre-TQM MAS had no such focus. A quality manager put it thus: 'We did not feel the need to have a strategy-oriented MAS until we implemented TQM practices in the company; the content of the post-TQM MAS is basically driven by the needs of our TQM systems.' The director of accounts remarked: 'We needed to redesign our MAS in order to satisfy more fully the information needs of our managers in TQM settings.' Clearly, the findings noted above indicate that the post-TQM MAS is much broader than the pre-TQM MAS within the company.

## 7. Discussion and conclusions

This paper reported on a study of the operation of total quality management (TQM) practices and information system design such as the management accounting system (MAS) within DTL, a New Zealand construction company. More particularly, we were interested in understanding the relationship between TQM practices and the MAS in the organisation. We followed a single case-study approach to collect the empirical evidence.

The observations reported in this paper suggest that TQM adoption at DTL helped management to show consistent values with its institutional environment and to gain acceptance from city councils, professional associations, and quality standards authorities. The external pressures compelling New Zealand businesses to give more attention to TQM were also identified in prior research (Batley, 1994; Fowler and Lord, 1995). It can thus be argued that sometimes organisations may adopt a new management system (such as TQM) by imitation and copy one another to increase their external legitimacy. These observations are consistent with the institutional theorists' view that by incorporating externally legitimated formal management systems, the organisation may be protected from having its conduct questioned (Meyer and Rowan, 1977; Dimaggio and Powell, 1983; Scapens, 1994; March and Olsen, 1989; Scott, 1994; for details, see Lapsley, 1994).

The findings suggest that the institutional practices noted above were acceptable to top management, as these were consistent with the prevailing culture within the organisation. We argued that TQM adoption needed a different way of defining and organising information processing within the organisation. As demonstrated above, management achieved this objective through consultation and taking small steps towards the implementation of TQM. These sequential steps, based on an overall TQM strategy, showed organisational members how TQM can make a difference in their activities. Implementation problems were also avoided by designing a system based on the existing quality system and showing the results from initial success.

The findings presented here suggest that TQM adoption in the organisation studied eventually caused a change in organisational control mechanisms such as the MAS. The MAS in the organisation became more decentralised and project-oriented, rather than the processing of financial information for merely project bidding and billing purposes. These results are consistent with suggestions made by Kaplan (1995) on the extended role of management accounting in organisational control systems (see also Shields, 1997).

Initial confusions and uncertainties about new information processing were handled by involving organisational members through teams. Once information was processed and distributed, employees began to find such information useful in their day-to-day activities and decision making. Such a behaviour is consistent with arguments put forward by Meyer and Rowan (1977) who suggest that by adopting a formal management system the commitment of both internal participants and external constituents may increase (see also Lapsley, 1994).

It is apparent from the results reported in this paper that, as the company aspired to be known for quality from its inception, it did not face conceptual difficulties for accommodating institutional requirements. Subsequent quality principles were carefully introduced within the organisation in a sequential manner based on the existing quality principles. Introduction to such commitment to quality was seen to be influenced by both institutional forces and the internal need to be competitive and successful within the market.

Methodologically, this study drew from a variety of theoretical issues on TQM and MAS. It sought to place emphasis on both describing and explaining the organisation's TQM-related actions, MAS changes, managers' perceptions and attitudes towards these systems and how these factors along with 'external' forces may determine management's choice and actions within the organisation studied. We therefore conclude that instead of making TQM and MAS merely the 'institutional' phenomena within an enterprise, they need to be considered and used by businesses as part of their economic activities and as an integral component of an overall organisational control package. For similar views on the issue, see Scapens (1994) and Scott (1987).

As this study related to a *single-site study*, future research adopting a *multiple-site study* may shed further light on this issue. The latter case focuses on cross-site comparison. It is to be noted that this study is not a unique case. The findings reported here can be generalised to other situations. Future research can compare the findings in this study with findings that relate to (1) a large, complex publicly traded international service organisation, (2) privately owned or publicly traded manufacturing firms, and (3) firms in other countries. Such an endeavour could open a new path of research, which may improve our understanding of the factors that influence the adoption of TQM and MAS changes in an organisation.

## References

Albright, T. L. and Roth, H. (1992). 'The measurement of quality costs: an alternative paradigm'. *Accounting Horizons*, June: 15–27.

Archer, S. and Otley, D. (1991). 'Strategy, structure, planning and control systems and performance evaluation—Rumenco Ltd'. *Management Accounting Research*, 2: 263–303.

Batley, T. W. (1994). 'Service quality in New Zealand'. *Total Quality Management*, 5 (4): 139–149.

Barney, J. (1986a). Organisational culture: can it be a source of sustained competitive advantage? *Academy of Management Review*, 11 (3): 656–665.

Barney, J. (1986b). 'Strategic factor markets: expectations, luck, and business strategy'. *Management Science*, 32 (10): 1231–1241.

Barney, J. (1991). 'Firm resources and sustained competitive advantage'. *Journal of Management*, 17: 99–120.

Birnberg, J. G., Shields, M. and Young, S. M. (1990). 'The case for multiple methods in empirical management accounting research (with an illustration from budget setting)'. *Journal of Management Accounting Research*, 2: 33–66.

Boaden, R. J. (1997). 'What is total quality management...and does it matter?'. *Total Quality Management*, 8(4): 153–171.

Champbell, R., Bollard, A. and Savage, J. (1989). *Productivity and quality in New Zealand: effects of deregulation*. NZIER Research Monograph, 46.

Chenhall, R. H. (1997). 'Reliance on manufacturing performance measures, total quality management and organizational performance'. *Management Accounting Research*, 8: 187–206.

Chua, W.-F. (1986). 'Radical developments in accounting thought'. *The Accounting Review*, October: 601–632.

Conti, T. (1993). *Building quality: a guide to management*. London: Chapman and Hall.

Cooper, R. (1996). 'Activity-based costing and the lean enterprise'. *Journal of Cost Management*, 6: 6–14.

Covaleski, M. A. and Dirsmith, M. W. (1988). 'The use of budgeting symbols in the political arena: a historically informed field study'. *Accounting, Organizations and Society*, 13 (1): 1–24.

Covaleski, M. A., Dirsmith, M. W. and Michelman, J. E. (1993). 'An institutional theory perspective on the drug framework case—mix accounting systems and health-care organizations'. *Accounting, Organizations and Society*, 18 (1): 65–80.

Dale, B. G. (1995). *Quality costing*. London: Chapman Hall.

Daniel, S. J., Reitsperger, W. D. and Gregson, T. (1995). 'Quality consciousness in Japanese and US electronics manufacturers: an examination of the impact of quality strategy and management control systems on perceptions of the importance of quality to expected management rewards'. *Management Accounting Research*, 6 (4): 367–382.

Deising, P. (1971). *Patterns of discovery in the social sciences*. Chicago: Aldine-Atherton.

Deming, W. E. (1982). *Quality, productivity and competitive position*. Cambridge, Massachusetts: MIT Centre for Advanced Engineering Study.

Deming, W. E. (1986). *Out of the crisis*. Massachusetts: Massachusetts Institute of Technology

Dimaggio, P. J. and Powell, W. W. (1983). 'The iron case revisited, institutional isomorphism and collective rationality in organizational fields'. *American Sociological Review*, 48: 147–160.

Ezzamel, M. (1994). 'From problem solving to problematization, relevance revisited'. *Critical Perspectives on Accounting*, 5: 269–280.

Ferriera, L. D. and Merchant, K. A. (1992). 'Field research in management accounting and control: a review and evaluation'. *Accounting, Auditing and Accountability Journal*, 5 (4): 3–34.

Foster, G. (1996). 'Management accounting in 2000'. *Journal of Cost Management*, Winter: 36–39.

Fowler, C. (1996). 'TQM in New Zealand: what impact'. *Australian Accountant*, December: 53–54.

Fowler, C. and Lord, B. (1995). 'ISO and TQM'. *Chartered Accountants Journal* (New Zealand), 74 (10): 33–38.

Fowler, C. (1994). 'The management accountant's role in total quality management'. M.Com Thesis, University of Canterbury, New Zealand.

Ghobadian, A. and Speller, S. (1994). 'Gurus of quality: a framework for comparison'. *Total Quality Management*, 5 (3): 53–69.

Greene, R. (1993). *Global quality*. Milwaukee: ASQC Quality Press.

Greene, R. (1995). *Competent re-engineering advice, warning, and recipes from eyewitness*. Reading, M.A.: Addison Wesley.

Goddard, A., Ingham, R., Spackman, A. and Williams, J. (1995). 'Quality of service for people with learning disabilities'. *Public Money and Management*, July–September: 59–63.

Grieve, H. F. (1990). 'Financial justification of quality assurance'. *Unpublished MBA Research Paper*, Victoria University of Wellington, New Zealand.

Hill, S. (1991a). 'Why quality circles failed but total quality might succeed'. *British Journal of Industrial Relations*, 29.

Hill, S. (1991b). 'How do you manage the flexible firm? The Total Quality Model, *Work Employment and Society*. 5 (3): 397–415.

Hopper, T. M., Storey, J. and Willmot, H. (1987). 'Accounting for accounting: towards the development of a dialectic view'. *Accounting, Organizations and Society*, 12 (5): 437–456.

Hoque, Z. and Hopper, T. (1994). 'Rationality, accounting and politics: a case study of management control in a Bangladeshi jute mill'. *Management Accounting Research*, 5: 5–30.

Hoque, Z. and Hooper, T. (1997). 'Political and industrial relations turbulence, competition and budgeting in the nationalised jute mills of Bangladesh'. *Accounting and Business Research*, 27 (2): 125–143.

Hoque, Z., Mia, L. and Alam, M. (1997). 'Competition, advanced manufacturing technology, balanced scorecard approach to performance measures and changes in MAS: an empirical investigation'. Paper presented at the *EAA Conference*, Graz, April.

Horngren, C. T., Foster, G. and Datar, S. M. (1994). *Cost accounting: a managerial emphasis* (8th edition). Englewood Cliffs: Prentice Hall.

Ittner, C. D., Larcker, D. F. and Rajan, M. V. (1997). 'The choice of performance measures in annual bonus contracts'. *The Accounting Review*, 2 (2): 231–256.

Johnson, H. T. (1994). 'Relevance regained, total quality management and the role of management accounting'. *Critical Perspectives on Accounting*, 5: 259–267.

Juran, J. M. (1993). 'A renaissance with quality'. *Harvard Business Review*, 71: 42–53.

Juran, J. M. and Gryna, F. M. Jr. (1993). *Quality planning and analysis*. New York: McGraw-Hill.

Kanji, G. K. and Asher, M. (1993). *Total quality management* 5 (5&6), Special Issue.

Kanji, G. K. (1996). 'Implementation and pitfalls of total quality management'. *Total Quality Management*, 7 (3): 331–343.

Kanji, G. K. (1997). *Total Quality Management*, 8 (2&3), Special Issue.

Kaplan, R. S. and Norton, D. P. (1992). 'The balanced scorecard—measures that drive performance'. *Harvard Business Review*, January–February: 71–79.

Kaplan, R. S. (1994). 'Management accounting (1984–1994): development of new practice and theory'. *Management Accounting Research*, 5: 247–260.

Kaplan, R. S. (1995). 'New roles for management accountants'. *Journal of Cost Management*, Fall: 6–12.

Kaplan, R. S. and Norton D. P. (1996). *The balanced scorecard: translating strategy into action*. Harvard Business Press.

Kaplan, R. and Atkinson, A. A. (1998). *Advanced management accounting*. Prentice Hall.

Lapsley, I. (1994). 'Responsibility accounting revived: market reforms and budgetary control in health care'. *Management Accounting Research*, 5: 337–352.

Lowe, A., de Wild, A. and Shewan, C. (1992). 'Total quality management and the management accountant'. *Chartered Accountants' Journal* (New Zealand), July: 25–29.

Majaro, S. (1992). *Managing ideas for profit: the creative gap*. London: McGraw-Hill.

March, J. G. and Olsen, J. (1989). *Rediscovering institutions*. New York: Free Press.

McClintock, B. L. (1993). 'Accounting for quality in New Zealand firms'. Unpublished MBA Dissertation, Victoria University of Wellington, New Zealand, February.

McNair, C. J., Lynch, R. L. and Cross, K. F. (1990) 'Do financial and non-financial performance measures have to agree'. *Management Accounting* (USA), November: 79–90.

Mehra, S., Sirias, D. and Hoffman, J. M. (1998). 'A critical analysis of total quality management implementation'. *International Journal of Applied Quality Management*, 1 (1): 71–80.

Meyer, J. W. and Rowan, B. (1977). 'Institutionalized organizations: formal structure as myth and ceremony'. *American Journal of Sociology*, September: 340–363.

Meyer, J. W. and Scott, W. R. (1992). *Organizational environments: ritual and rationality*. Newbury Park, California: Sage Publications.

Morgan, G. and Smircich, L. (1980). 'The case for qualitative research'. *The Academy of Management Review*, 5 (4): 491–500.

Nanni, A. Jr., Dixon, J. R. and Vollman, T. E. (1992). 'Integrated performance measurement: management accounting to support the new manufacturing realities'. *Journal of Management Accounting Research*, 4: 1–19.

Needham, J., Mak, Y. T. and Carr, S. (1997). 'The impact of extent of TQM adoption, quality-focused strategy and size on performance evaluation and reward systems'. *Unpublished Working Paper*, Massey University.

Otley, D. T. (1994). 'Management control in contemporary organizations: towards a wider framework'. *Management Accounting Research*, 5: 289–299.

Peters, T. J. and Waterman, R. H. Jr. (1982). *In search of excellence: a lesson from America's best run companies*. New York: Harper and Row.

Powell, T. C. (1995). 'Total quality management as competitive advantage: a review and empirical study'. *Strategic Management Journal*, 16: 15–37.

Riah-Belkaoui, Ahmed. (1993). *Quality and control: an accounting perspective*. Westport, Conn: Quorum.

Robson, M. (1982). *Quality circles: a practical guide*. Gower: Aldershot.

Ross, J. (1993). *Total quality management: text, cases and readings*. St. Lucie Press, Delray Beach, FL.

Scapens, R. W. (1990). 'Researching management accounting practice: the role of case study methods'. *The British Accounting Review*, 22: 259–281.

Scapens, R. W. (1994). 'Never mind the gap: towards an institutional perspective on management accounting practice'. *Management Accounting Research*, 5: 301–321.

Scott, W. R. (1987). 'The adolescence of institutional theory'. *Administrative Science Quarterly*, 32: 493–511.

Scott, W. R. (1994). *Organisational sociology*. London: Aldershot.

Shank, J. K. (1995). 'Theme issue on management accounting: whither and whence?' *Journal of Cost Management* (editorial), Fall: 3–4.

Shank, J. K. and Govindarajan, V. (1994). 'Measuring the "cost of quality": a strategic cost management perspective'. *Journal of Cost Management*, Summer: 5–17.

Shields, M. D. (1997). 'Research in management accounting by North Americans in the 1990s'. *Journal of Management Accounting Research*, 9: 3–62.

Suver, J. D., Neumann, B. R. and Boles, K. E. (1992). 'Accounting for the costs of quality'. *Healthcare Financial Management*, September: 29–37.

Swain, M. R. and Denna, E. L. (1998). 'Making new wine: useful management accounting systems'. *International Journal of Applied Quality Management*, 1 (1): 25–44.

Terziovski, M., Sohal, A. and Samson, D. (1996). 'Best practice implementation of total quality management: multiple cross-case analysis of manufacturing and service organisations'. *Total Quality Management*, 7 (5): 459–481.

Yin, R. K. (1989). *Case study research: design and methods*. London: Sage.

Wooding, P. (1987). 'Liberalizing the international trade, in Billiard, A. and Buckle, R. (Eds.)'. *Economic Liberalization in New Zealand*. Auckland: Allen and Urin.

Wruck, K. H. and Jensen, M. C. (1994). 'Science, specific knowledge, and total quality management'. *Journal of Accounting and Economics*, 18: 247–287.

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# A neural network approach to the prediction of going concern status

**Hian Chye Koh and Sen Suan Tan***

**Abstract**—The assessment of a firm's going concern status is not an easy task. To assist auditors, going concern prediction models based on statistical methods such as multiple discriminant analysis and logit/probit analysis have been explored with some success. This study attempts to look at a different and more recent approach—neural networks. In particular, a neural network model of the feedforward, backpropagation type was constructed to predict a firm's going concern status from six financial ratios, using a data set containing 165 non-going concerns and 165 matched going concerns. On an evenly distributed hold-out sample, the trained network model correctly predicted all 30 test cases. The results suggest that neural networks can be a promising avenue of research and application in the going concern area.

## 1. Introduction

In a recent article, Trigueiros and Taffler (1996) provided an overview of the potential role of the neural network methodology in empirical accounting research, and suggested several research areas in accounting where neural network approaches could make a potential contribution. Along this line, the objective of this paper is to construct a going concern prediction model using the neural network approach. Going concern is a non-trivial concept that has been the focus of rigorous research efforts for decades. It has continued to be a major concern to both academics and practitioners, as evidenced by the recent pronouncements issued by the New Zealand Society of Accountants (NZSA, 1995) and Canadian Institute of Chartered Accountants (CICA, 1996), and recent research (see, for example, LaSalle and Anandarajan, 1996; Chen and Church, 1996; and Goodman et al., 1995).

## 2. Going concern concept and assessment

Generally, existing auditing standards require auditors to assess the going concern status of audit clients. In the US, for example, SAS 59 (AICPA, 1988) requires an active auditor involvement in assessing an entity's continued existence. However, the guidelines contained in SAS 59 as to how auditors should make going concern assessments have been criticised as being too subjective, general and ambiguous (see Koh and Killough, 1988). Given the inadequacy of auditing guidelines, it is not surprising that some authors have concluded that in making going concern assessments, 'the auditor is still very much on his own, having to rely virtually entirely on his subjective judgement and experience' (Bosch, 1984), and that 'the tools available for formulating a qualified going concern opinion are not adequate' (Zavgren, 1983).

Empirical evidence has shown that the assessment of going concern status may be a difficult task. For example, in a study of 86 listed UK companies that filed for bankruptcy in the period 1977 to 1983, it was found that only 21 of these companies (i.e., slightly less than 25%) were qualified on a going concern basis in their last financial statement prior to bankruptcy (Taffler and Tseung, 1984). In another study, Menon and Schwartz (1986) found similar results. In particular, only 63 out of 147 US bankrupt companies (i.e., less than 43%) were qualified on a going concern basis prior to bankruptcy. More recently, Koh and Brown (1991) reported in their sample of 40 US bankrupt companies that only 16 (i.e., 40%) were qualified on a going concern basis prior to bankruptcy. Also, Raghunandan and Rama (1995) reported that 90 (i.e., 51%) of their sample of 195 US bankrupt companies were qualified on a going concern basis prior to bankruptcy. These poor field records demonstrate the difficulty of assessing an entity's going concern status.

In view of the above, several researchers have advocated the use of statistical techniques to aid the auditor in assessing the going concern status of audit clients. These techniques are embodied in going concern prediction models in the literature and have included statistical methods such as multiple discriminant analysis (e.g., Altman and McGough, 1974; Altman, 1982; Levitan and Knoblett, 1985; and Koh and Killough, 1990) and logit and probit analyses (e.g., Menon and Schwartz, 1987; Dopuch, Holthausen and Leftwich, 1987; Koh, 1991; and LaSalle, Anandarajan and Miller, 1996).

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In recent years, the neural network approach has been proposed as an appropriate (if not better) alternative to classical statistical classification techniques under certain conditions (Denton, Hung and Osyk, 1990; Hart, 1992). The neural networks literature suggests that neural networks can provide results that are comparable to, if not better than, results from statistical techniques. Further, neural networks can alleviate some of the limitations inherent in the use of statistical techniques (e.g., restrictive statistical assumptions). Thus, neural networks appear to have significant potential in the assessment of going concern status (see, for example, Coats and Fant, 1993; Yoon et al., 1993; and Altman, Marco and Varetto, 1994).

Given this, this paper explores the use of the neural network approach in the context of going concern prediction. The findings of the study are expected to be useful in assessing the comparative utility of different classification techniques, and in providing a tool to auditors for making going concern decisions.

## 3. A neural network model for going concern prediction

The neural network approach to classification and prediction is well documented in the literature and hence will not be repeated here (see, for example, Trigueiros and Taffler, 1996). To explore its use in going concern prediction, this study applies neural networks to a prior study by Koh (1991), who compared the predictions of a going concern prediction model and the assessments of auditors on the going concern status of a sample of 165 going concerns and 165 matched non-going concerns. In Koh (1991), probit analysis was applied to data from 330 US companies for the period 1978–1985 to estimate the model coefficients. The Lachenbruch U method hold-out accuracy rates of the model are 85.45% for non-going concerns, 100% for going concerns, and 99.9% overall (weighted by the relative occurrence of going and non-going concerns). The corresponding accuracy rates of the auditors based on their audit reports are 54.37% for non-going concerns, 100% for going concerns, and 99.73% overall.

In this study, a three-layer, feedforward, backpropagation neural network was used. The model consisted of an input layer of six neurons for six financial ratios, a hidden layer of 13 hidden nodes, and an output layer of one node. The output ranged from 0 to 1. In interpreting the output, an observation with an output value of less than 0.5 was classified as a going concern, while one with an output value of greater than or equal to 0.5 was classified as a non-going concern.

The sample data for constructing the neural network model was taken from Koh's (1991) study. The following six financial ratios were used as inputs to the neural network: (1) quick assets to current liabilities (QACL), (2) market value of equity to total assets (MVTA), (3) total liabilities to total assets (TLTA), (4) interest payments to earnings before interest and tax (IEBT), (5) net income to total assets (NITA), and (6) retained earnings to total assets (RETA). (See Koh [1991] for details on the sample data and variable definitions.) The neural network model for going concern prediction is shown in Figure 1.

## 4. Results of the neural network model

The neural network going concern prediction model was implemented with the WinNN™ software.[1] Approximately 10% (i.e., 30 test cases, evenly distributed between going and non-going concerns) of Koh's (1991) data set of 330 observations were randomly selected and set aside for a hold-out evaluation of the neural network performance. The remaining 300 observations were used to train the network.

As shown in Figure 1, the neural network going concern prediction model comprises six input nodes (i.e., the six financial ratios) in the input layer, 13 hidden nodes in the hidden layer, and an output node (i.e., the prediction of going concern status) in the output layer. Let the input nodes, hidden nodes and output node be denoted I (= 1 to 6), H (= 1 to 13) and O (= 1), respectively. Further, let inputs, outputs and interconnecting weights be denoted by i, o and $w_{ij}$ respectively. Then, the input to a hidden node ($i_H$) is calculated as the summation of input layer outputs ($o_I$) multiplied by the corresponding interconnecting weights ($w_{IJ}$). That is:

$$i_H = \sum w_{ij}\, o_I \tag{1}$$

Also, as described by the sigmoid function, the output of a hidden node ($o_H$) as a function of its inputs ($i_H$) is given by:

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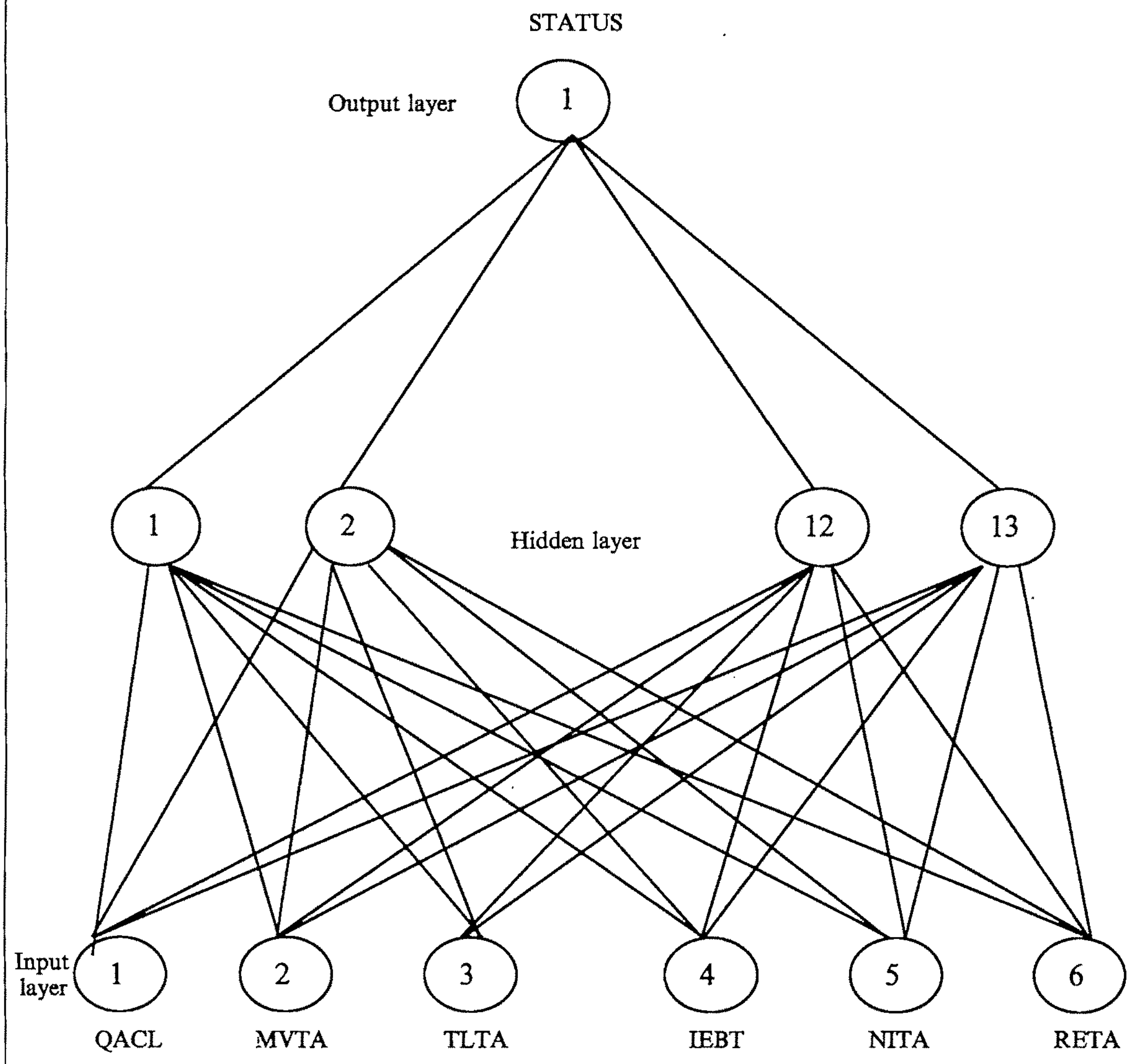
[1] WinNN™, a neural network software for personal computers in the Microsoft Windows™ operating environment, is developed by Dr Y. Danon, 50 Hagilad Street, Arad 89034, Israel; e-mail: danony@rpi.edu.

**Figure 1**
**Neural network model for going concern prediction**



STATUS = Going concern status of company
QACL = Quick assets to current liabilities
MVTA = Market value of equity to total assets
TLTA = Total liabilities to total assets
IEBT = Interest payments to earnings before interest and tax
NITA = Net income to total assets
RETA = Retained earnings to total assets

$$o_H = \frac{1}{1 + e^{-i_H}} \qquad (2)$$

Similar calculations apply to the hidden nodes in the hidden layer and the output node in the output layer. That is:

$$i_o = \sum w_{ij} \, o_H \qquad (3)$$

$$o_o = \frac{1}{1 + e^{-i_o}} \qquad (4)$$

(Note: The interconnecting weights in [1] are not the same as those in [3]).

The interconnecting weights in the neural network going concern prediction model are summarised in Table 1.

On the hold-out test data, using a cut-off level of 0.5 in the output to signify a going concern versus a non-going concern, the trained network correctly classified all 30 test cases, comprising 15 going concerns and 15 non-going concerns. That is, the network's accuracy rate is 100% for going concerns, non-going concerns, and overall, in each case. The accuracy rates of the auditors, the probit model (Koh, 1991) and the neural network are summarised in Table 2. The hold-out results are presented in Table 3.

## 4. Conclusion

The results suggest that the neural network is at least as good as both the auditors and the probit model for predicting going concern status of firms from financial ratios. It should be noted, however, that this comparison is not entirely equitable; in particular, the Lachenbruch U method for hold-out testing with the probit model was not attempted here. The need to retrain the network for each test case would be infeasible within the constraints of the study. A more exhaustive hold-out test like the Lachenbruch U method could conceivably reduce the apparent predictive capability of the network model.

On the other hand, there are several ways in which the performance of the present neural network may be further improved. The most readily accomplished, perhaps, would be to enlarge the training data set, or continue training the network as more training cases are collected. Additional training could help the network to pick up more new patterns, or strengthen its recognition of some patterns that it has difficulty with presently.

A more important consideration is the implicit model of going concern used. In the study, the network has been constrained to working with only the six financial ratios used in Koh (1991), which may not be the most appropriate for the network model. A better approach would be to begin network training with a large number of input variables, and to allow the network itself to select the most discriminating variable through its internal process of self-organisation. Thus, a parsimonious model that is more internally consistent and correct from the network's point of view can be arrived at rather than be arbitrarily imposed at the outset.

**Table 1**
**Interconnecting weights of neural network model**

| *From input*<br>*To hidden* | *Node 1* | *Node 2* | *Node 3* | *Node 4* | *Node 5* | *Node 6* |
|---|---|---|---|---|---|---|
| *Node 1* | −1.7131 | −0.7445 | 1.0923 | 0.7894 | −1.2919 | 1.4748 |
| *Node 2* | 2.4090 | 0.4731 | 0.9675 | 1.4973 | 1.5736 | 0.0608 |
| *Node 3* | −4.7666 | −0.6464 | −0.4594 | 1.1811 | −3.0948 | 1.1088 |
| *Node 4* | 2.4481 | 1.5166 | −1.9108 | −1.0374 | 3.4716 | −1.7151 |
| *Node 5* | −1.8592 | 0.8320 | 0.5539 | −0.3472 | −3.8518 | 1.0478 |
| *Node 6* | 2.3792 | −1.6206 | 0.9388 | 0.9583 | 0.5343 | −1.4635 |
| *Node 7* | −0.3777 | −1.9838 | 4.7112 | 0.3435 | −4.1620 | 0.2471 |
| *Node 8* | 0.7749 | 0.0680 | −3.0032 | −0.9030 | 3.8518 | 2.9925 |
| *Node 9* | 0.1082 | −2.7006 | 0.8004 | 2.8183 | −1.4552 | −1.5489 |
| *Node 10* | −1.4331 | −3.8039 | 1.5506 | −1.5812 | −1.5487 | 1.6800 |
| *Node 11* | −1.0690 | 1.1740 | 1.8209 | 3.2994 | 1.9189 | −1.3918 |
| *Node 12* | −3.4508 | 1.6278 | 1.5102 | −1.2572 | −1.4740 | −3.2479 |
| *Node 13* | 1.5860 | −1.8089 | 1.3851 | 3.2692 | −0.9288 | −1.7903 |

*From hidden nodes to output node*

| *Node 1* | *Node 2* | *Node 3* | *Node 4* | *Node 5* | *Node 6* | *Node 7* |
|---|---|---|---|---|---|---|
| −0.2511 | 0.2906 | −1.9166 | 2.4069 | −1.0360 | 1.1450 | −4.0427 |
| *Node 8* | *Node 9* | *Node 10* | *Node 11* | *Node 12* | *Node 13* | |
| 4.5182 | −0.7421 | −2.4982 | 1.3286 | −3.5450 | 0.4856 | |

**Table 2**
**Comparison of going concern prediction results**

| | *Non-going concerns* | *Going concerns* | *Overall (weighted)* |
|---|---|---|---|
| Audit opinion | 54.37% | 100% | 99.73% |
| Probit model | 84.45% | 100% | 99.91% |
| Neural network | 100% | 100% | 100% |

**Table 3**
**Hold-out test data and results**

| *Item* | *QACL* | *MVTA* | *TLTA* | *IEBT* | *NITA* | *RETA* | *Predicted* | *Actual* |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.39 | 0.04 | 1.09 | −0.66 | −0.15 | −0.16 | 0.0002 | 0 |
| 2 | 3.39 | 0.40 | 0.38 | 0.06 | 0.50 | 0.14 | 0.9996 | 1 |
| 3 | 0.45 | 1.09 | 0.66 | −0.65 | −1.46 | −0.34 | 0.0001 | 0 |
| 4 | 1.01 | 0.28 | 0.55 | −0.56 | 0.33 | −0.05 | 0.9662 | 1 |
| 5 | 0.59 | 0.21 | 0.58 | 0.12 | 0.27 | 0.15 | 0.8006 | 1 |
| 6 | 0.21 | 0.06 | 0.81 | 6.42 | −0.01 | −0.04 | 0.0092 | 0 |
| 7 | 4.98 | 0.03 | 0.84 | 1.00 | −0.03 | 0.02 | 0.8800 | 1 |
| 8 | 1.17 | 1.17 | 0.61 | 0.34 | 0.03 | 0.04 | 0.9346 | 1 |
| 9 | 1.20 | 0.17 | 0.77 | −3.11 | 0.03 | −0.05 | 0.0779 | 0 |
| 10 | 0.36 | 0.24 | 0.77 | −1.60 | 0.01 | −0.11 | 0.0021 | 0 |
| 11 | 1.40 | 0.51 | 0.46 | 0.21 | 0.32 | 0.06 | 0.9970 | 1 |
| 12 | 0.69 | 0.43 | 0.75 | −0.61 | −0.34 | −0.17 | 0.0022 | 0 |
| 13 | 1.21 | 0.31 | 0.52 | 0.19 | 0.17 | 0.06 | 0.9618 | 1 |
| 14 | 1.89 | 1.03 | 0.61 | 0.08 | 0.38 | 0.13 | 0.9989 | 1 |
| 15 | 1.29 | 1.16 | 0.71 | 0.42 | 0.21 | 0.06 | 0.9833 | 1 |
| 16 | 23.22 | 0.94 | 0.05 | 0.00 | 0.16 | −0.02 | 0.9997 | 1 |
| 17 | 0.38 | 1.57 | 0.63 | −0.06 | 0.03 | −0.24 | 0.2669 | 0 |
| 18 | 2.31 | 1.30 | 0.30 | 0.03 | 0.66 | 0.13 | 0.9997 | 1 |
| 19 | 1.49 | 0.33 | 0.65 | 0.15 | 0.32 | 0.05 | 0.9860 | 1 |
| 20 | 0.43 | 0.98 | 1.10 | −0.09 | −0.47 | −0.47 | 0.0023 | 0 |
| 21 | 0.61 | 0.15 | 0.77 | 0.51 | −0.58 | 0.17 | 0.0007 | 0 |
| 22 | 0.67 | 0.01 | 0.77 | 1.39 | 0.18 | −0.05 | 0.1721 | 0 |
| 23 | 1.06 | 0.48 | 0.49 | 0.05 | 0.47 | 0.14 | 0.9981 | 1 |
| 24 | 2.32 | 0.21 | 0.35 | 0.15 | 0.38 | 0.12 | 0.9992 | 1 |
| 25 | 0.10 | 0.12 | 0.70 | 0.97 | 0.14 | −0.11 | 0.0067 | 0 |
| 26 | 0.64 | 0.12 | 0.92 | 12.58 | −0.12 | −0.09 | 0.0105 | 0 |
| 27 | 0.43 | 0.22 | 1.11 | 0.47 | −0.16 | −0.16 | 0.0013 | 0 |
| 28 | 0.08 | 1.60 | 2.03 | −0.12 | −5.22 | −1.75 | 0.0000 | 0 |
| 29 | 1.26 | 0.38 | 0.47 | 0.19 | 0.29 | 0.07 | 0.9938 | 1 |
| 30 | 0.00 | 0.40 | 1.21 | −0.11 | −0.62 | −0.69 | 0.0001 | 0 |

QACL = Quick assets to current liabilities
MVTA = Market value of equity to total assets
TLTA = Total liabilities to total assets
IEBT = Interest payments to earnings before interest and tax
NITA = Net income to total assets
RETA = Retained earnings to total assets
Predicted = Predicted score from neural network model
Actual = Actual status of company (0 = non-going concern; 1 = going concern)

Other neural network architectures can also be explored. Besides the feedforward, backpropagation strategy used in the study, a large repertoire of other approaches has been developed, some of which may be more suitable than others for the task at hand. Alternative architectures include variations on the orthodox feedback, backpropagation scheme, as well as many fundamentally different architectures such as the probabilistic and general regression neural networks (which train well on sparse data sets) and the Kohonen self-organising feature map (which uses an unsupervised training scheme).

Finally, the sensitivity of the results to different hold-out samples is not examined in the study. Thus, the robustness of the findings is not verified. Further, while the neural network approach performs better than probit analysis and auditors in the study, the source of any improved performance (i.e., how any improvement has been achieved) is not investigated.

Notwithstanding the above, it is surmised that with respect to the usefulness of neural networks as an aid to auditors, an approach incorporating the neural network in going concern prediction and other auditing research is a potentially powerful alternative or complement to the more commonly used statistical methods. While further research is useful in this relatively new field, neural networks are generally effective for modelling complex, non-linear processes where conventional methods may not be feasible or may lack resolution. A significant benefit is that neural methods can now be implemented very easily by using one of the increasingly available and inexpensive software packages for personal computers such as BrainMaker™, NeuroShell™, and WinNN™. For greater flexibility, neural networks can also be readily custom-coded using any high-level programming language, or even in general purpose spreadsheet software.

## References

Altman, E. I. (1982). 'Accounting implications of failure prediction models'. *Journal of Accounting, Auditing and Finance*, 6 (September): 4–19.

Altman, E. I. and McGough, T. P. (1974). 'Evaluation of a company as a going concern'. *Journal of Accountancy* (December): 50–57.

Altman, E. I., Marco, G. and Varetto, F. (1994). 'Corporate distress diagnosis: comparisons using linear discriminant analysis and neural networks (the Italian experience)'. *Journal of Banking and Finance*, 23 (No. 4): 589–609.

American Institute of Certified Public Accountants (1988). 'The auditor's consideration of an entity's ability to continue in existence'. *Statement on Auditing Standards No. 59*, New York: AICPA.

Bosch, P. J. (1984). 'A definition of the going concern concept'. *Accountancy SA*, (February): 237–40.

Canadian Institute of Chartered Accountants (1996). 'Going concern (exposure draft)' in *CA Magazine*, 129 (March): ED1–ED4.

Chen, K. C. W. and Church, B. K. (1996). 'Going concern opinions and the market's reaction to bankruptcy filings'. *Accounting Review*, 71 (January): 117–128.

Coats, P. and Fant, F. (1993). 'Recognizing financial distress patterns using a neural network tool'. *Financial Management*, 22 (3): 142–165.

Denton, J. W., Hung, M. S. and Osyk (1990). 'A neural network approach to the classification problem'. *Expert Systems with Applications*, 1: 417–424.

Dopuch, N., Holthausen, R. W. and Leftwich, R. W. (1987). 'Predicting audit qualifications with financial and market variables'. *Accounting Review* (July): 431–54.

Goodman, B., Braunstein, D. N., Reinstein, A. and Gregory, G. W. (1995). 'Explaining auditors' going concern decisions: assessing management's capability'. *Journal of Applied Business Research*, II (Summer): 82–93.

Hart, A. (1992). 'Using neural networks for classification tasks—some experiments on datasets and practical advice'. *Journal of the Operational Research Society*, 43 (3): 215–226.

Koh, H. C. (1991). 'Model predictions and auditor assessments of going concern status'. *Accounting and Business Research* (Autumn): 331–338.

Koh, H. C. and Brown, R. M. (1991). 'Probit predictions of going and non-going concerns'. *Managerial Auditing Journal*, 6 (3): 18–23.

Koh, H. C. and Killough, L. N. (1988). 'Proposed statement on auditing standards: the auditor's consideration of an entity's ability to continue existence'. *Virginia Accountant Quarterly* (March): 24–26.

Koh, H. C. and Killough, L. N. (1990). 'The use of multiple discriminant analysis in the assessment of the going concern status of an audit client'. *Journal of Business Finance & Accounting* (Spring): 179–192.

LaSalle, R. E. and Anandarjan, A. (1996). 'Auditors' views on the type of audit reports issued to entities with going concern uncertainties'. *Accounting Horizon*, 10 (June): 51–72.

LaSalle, R. E., Anandarjan, A. and Miller, A. F. (1996). 'Going concern uncertainties: disclaimer of opinion versus unqualified opinion with modified wording'. *Auditing: A Journal of Practice & Theory*, 15 (Fall): 29–48.

Levitan, A. S. and Knoblett, J. A. (1985). 'Indicators of exceptions to the going concern assumption'. *Auditing: A Journal of Practice and Theory*, 4 (Fall): 26–39.

Menon, K. and Schwartz, K. B. (1986). 'The auditor's report for companies facing bankruptcy'. *Journal of Commercial Bank Lending* (January): 42–52.

Menon, K. and Schwartz, K. B. (1987). 'An empirical investigation of audit qualification decisions in the presence of going concern uncertainties'. *Contemporary Accounting Research* (Spring): 302–15.

New Zealand Society of Accountants (1995). 'Going concern (auditing standard no. 11)' in *Chartered Accountants Journal* (New Zealand), 74 (July): 86–93.

Raghunandan, K. and Rama, D. V. (1995). 'Audit reports for companies in financial distress: before and after SAS no. 59'. *Auditing: A Journal of Practice & Theory*, 14 (Spring): 50–63.

Taffler, R. J. and Tseung, M. (1984). 'The audit going concern qualification in practice—exploding some myths'. *Accountant's Magazine* (Scotland), (July): 263–269.

Trigueiros, D. and Taffler, R. (1996). 'Neural networks and empirical research in accounting'. *Accounting and Business Research*, 26 (No. 4): 347–355.

Yoon, Y., Swales, G. and Margavio, T. (1993). 'A comparison of discriminant analysis versus artificial neural networks'. *Journal of the Operational Research Society*, 44 (1): 51–60.

Zavgren, C. V. (1983). 'The prediction of corporate failure: the state of the art'. *Journal of Accounting Literature*, 2: 1–38.

*Accounting and Business Research*, Vol. 29. No. 3. pp. 217–227. 1999

# Are large auditors more accurate than small auditors?

Clive Lennox*

**Abstract**—Theoretical research suggests that large auditors have more incentive to issue accurate reports compared to small auditors (DeAngelo, 1981; Dye, 1993). Controlling for the client characteristics of large and small auditors, this paper shows that large auditors issue reports that are more accurate and more informative signals of financial distress. These findings are consistent with the theoretical prediction of a positive relationship between auditor size and auditor accuracy.

## 1. Introduction

Existing theories predict that large auditors have more incentive to issue accurate reports.[1] Reputation arguments suggest that large auditors suffer a greater loss of rents as a result of inaccurate reporting (DeAngelo, 1981). Moreover, auditors have more incentive to give accurate reports, the greater is the litigation penalty that is suffered for inaccuracy (Dye, 1993). Since large auditors have deeper pockets than small auditors, they should have more incentive to issue accurate reports.[2]

Much empirical evidence indicates that large audit firms are associated with higher quality. Large auditors tend to receive higher fees than small auditors (Simunic and Stein, 1987; Beatty, 1989); in IPOs, high reputation investment banks prefer their clients to hire large auditors, and companies that do hire large auditors are charged a smaller banking fee (Menon and Williams, 1991; Balvers et al., 1988). These results suggest that large auditors offer higher quality services; however, quality is not really the same thing as accuracy. Large auditors may give a higher quality service, but this does not necessarily mean that large auditors are more accurate.

Theories on auditor selection have argued that a company has more incentive to hire an accurate auditor when it has favourable information and when agency costs are high. This is because an accurate auditor is more likely to attest to the company's private information and because hiring an accurate auditor can be a signal to investors that the company has favourable private information (Titman and Trueman, 1986; Datar et al., 1991). Empirical studies have tested these theories by examining the stock market reaction to different types of auditor switch and by examining the relationship between agency costs and auditor choice. If companies with favourable private information prefer to hire large auditors, the stock market should react more favourably when companies switch to large auditors than to small auditors.

Some studies have found that the stock market reacts in the hypothesised direction (Nichols and Smith, 1983; Eichenseher et al., 1989); other studies have found no significant difference in market reaction for different types of switch (Firth and Smith, 1992; Johnson and Lys, 1990; Schwartz and Soo, 1995). Unfortunately, the event study approach is not a useful way of testing whether large auditors are more accurate, because a switch to a large (small) auditor may signal good (bad) news for reasons that have nothing to do with accuracy. In particular, a company may switch to a large (small) auditor if it is expecting to grow (decline). Thus, the stock market reaction may reflect a com-

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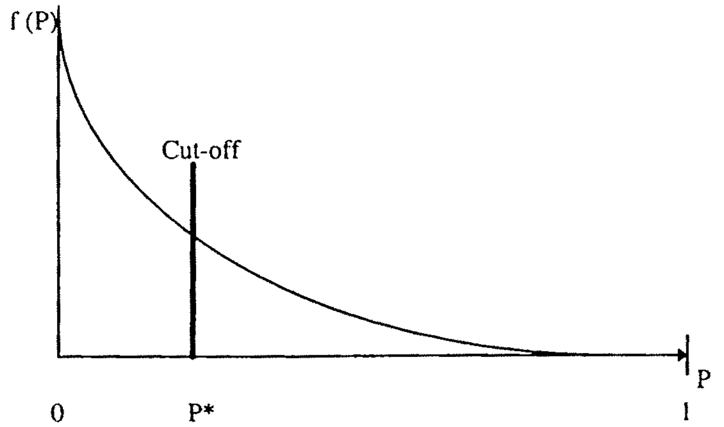
[1] Between 1987–94, the large UK audit firms were known as the 'Big Six', comprising Price Waterhouse, KPMG Peat Marwick, Arthur Andersen, Touche Ross, Coopers & Lybrand and Ernst & Young. All other audit firms are referred to as small in this paper.

[2] Large audit firms have deeper pockets than small audit firms because of joint and several liability. The *Economist* writes (7 October, 1995): 'As partnerships, the large accountancies operate under the legal principle of joint and several liability. This means that when a company collapses, its auditors who not only have deep pockets, but cannot abscond, may be hit for the entire bill if they were negligent, even if other parties were careless too. Moreover, if the claim amounts to more than an auditing firm's capital, all of the firm's partners are liable right down to their bootstraps for the bill—even if they had nothing to do with the error.' Similarly, the *Financial Times* writes (4 July, 1996): 'The big audit firms can find themselves targeted for lawsuits because of their "deep pockets"—including their statutory insurance cover.'

**Figure 1**
**An auditor's expectations about its clients' bankruptcy probabilities**



pany's product market opportunities rather than differential accuracy between auditors. Studies have generally confirmed the predicted relationship between agency costs and auditor choice—companies with high agency costs are more likely to hire large auditors (Francis and Wilson, 1988; Johnson and Lys, 1990; DeFond, 1992). Although this is consistent with the view that large auditors are more accurate, there is an alternative explanation—managers may simply value the prestige that comes from being associated with large auditors in much the same way as they might value non-profit-maximising profits.

In contrast to these studies, this paper directly investigates the relationship between auditor accuracy and auditor size. Using a bankruptcy model to control for differences in client characteristics, it shows that large auditors' reports are significantly more accurate indicators of financial distress compared to small auditors' reports. The next section describes the methodology used to evaluate the accuracy and informativeness of audit reports. The following sections describe the data and present the results.

## 2. Research methodology

### *2.1. Evaluating the accuracy of audit reports*

In evaluating the accuracy of audit reports, it is helpful to consider Figure 1. The horizontal axis shows an auditor's expectations about its clients' bankruptcy probabilities (P); the vertical axis shows the density function f(P). Figure 1 illustrates the case where most companies have low expected bankruptcy probabilities. An auditor is assumed to choose a 'cut-off probability' P*, which determines the number of companies that are given qualified reports; companies with low bankruptcy probabilities (those lying to the left of P*) are given unqualified reports while companies with high bankruptcy probabilities (those lying to the right of P*) are given qualified reports.

The main difficulty in measuring the accuracy of audit reports is that one does not directly observe whether companies deserve clean or qualified audit opinions. Therefore, previous research has used the bankruptcy outcome as an ex post measure of whether a company should have been given a qualified report. This approach is not a perfect measure of accuracy—for example, a company could enter bankruptcy after being given an unqualified report if there were no obvious problems when the audit was undertaken; similarly, a company could survive following a qualified report even if there were clear financial problems. Therefore, previous research has used bankruptcy models as a benchmark for evaluating the accuracy of audit reports (Altman and McGough, 1974; Koh, 1991).

For financially distressed companies that survive, the bankruptcy model is likely to predict bankruptcy and the auditor may qualify; similarly, for companies that are apparently healthy prior to failure, the bankruptcy model may incorrectly predict survival and the auditor is likely to give an unqualified report. If bankruptcy is difficult (easy) to predict, one would expect error rates to be high (low) for both the model and auditors. If auditors have access to private information that is useful for identifying failing companies, one might expect audit reports to be more accurate than the model. If audit reports are affected by factors other than the probability of bankruptcy, one might expect audit reports to be less accurate than the model.

This paper compares the accuracy of audit reports and a bankruptcy model by measuring two errors. Following Koh (1991), the type I error rate is equal to the proportion of failing companies that are given unqualified reports and the type II error rate is equal to the proportion of non-failing companies that are given qualified reports.[3] Practitioners might argue that Koh's definition of a type II error is problematic, since a qualified report signals a potential problem rather than predicts bankruptcy. The reason for calculating both type I and type II errors is best explained by considering an extreme case, where an auditor always gives qualified reports (i.e. the auditor chooses $P^* = 0$). If one ignored type II errors and simply measured accuracy in terms of type I errors, one would have the misleading impression that this uninformative reporting strategy maximises accuracy.

Calculating both type I and type II errors helps clarify an important distinction between the accuracy and conservatism of auditors. For a given distribution of bankruptcy probabilities, an increase in auditor conservatism raises the frequency of qualified reports (a more conservative auditor chooses a lower $P^*$). Therefore, a more conservative auditor has lower type I and higher type II error rates for a given level of accuracy. On the other hand, a more accurate auditor has lower type I and type II error rates, for a given level of conservatism (i.e. for a given choice of $P^*$).

### 2.2. *Evaluating the incremental information content of audit reports*

In addition to measuring the accuracy of audit reports, it is useful to test whether reports signal useful incremental information about the probability of bankruptcy (Hopwood et al., 1989). The accuracy of audit reports is not necessarily related to their incremental information content. For example, auditors might give going-concern qualifications (clean opinions) when their private information is less (more) favourable than public information (Grout et al., 1994). In this view, audit opinions are used to signal auditors' private information and do not fully reflect all public information. Thus, it is theoretically possible that the incremental information content of audit reports could be high (low) even if accuracy is low (high). The role of public and private information is shown in equations (1) and (2):

$$FAILS_{it}^* = \beta_0 + \beta_1 X_{it} + \beta_2 Z_{it} + u_{1it} \qquad (1)$$

$$GQ_{it}^* = \gamma_0 + \gamma_1 X_{it} + \gamma_2 Z_{it} + u_{2it} \qquad (2)$$

where:

$FAILS_{it}$ = 1 if company i issues its final annual report in year t prior to entering bankruptcy;
= 0 otherwise. $FAILS_{it}^* \geq 0$ if $FAILS_{it} = 1$; $FAILS_{it}^* < 0$ if $FAILS_{it} = 0$.
$GQ_{it}$ = 1 if company i receives a going-concern qualification in year t; = 0 otherwise. $GQ_{it}^* \geq 0$ if $GQ_{it} = 1$; $GQ_{it}^* < 0$ if $GQ_{it}^* = 0$.
$X_{it}$ = Publicly observable variables capturing financial health.
$Z_{it}$ = Privately observable variables capturing financial health.

Equation (1) states that the likelihood of failure depends on variables that capture the financial health of the company. Some of these variables are publicly observable ($X_{it}$); others are observable to the auditor but not publicly observable ($Z_{it}$). Equation (2) allows audit reporting to depend on the financial health of companies ($X_{it}$ and $Z_{it}$). It is assumed that $E[u_{1it}\ u_{2it}] = 0$. This makes sense because there is usually a lag of several months between the audit reporting decision and the bankruptcy event.

One would like to test whether audit reports signal valuable private information about the probability of bankruptcy. However, one cannot directly test the null hypothesis $\gamma_2 = 0$ because the statistician does not observe $Z_{it}$. This problem can be circumvented by including the audit report variable ($GQ_{it}$) in the bankruptcy model as shown in equation (3):

$$FAILS_{it}^* = \beta_0 + \beta_1 X_{it} + \beta_3 GQ_{it} + v_{it} \qquad (3)$$

Under the null hypothesis that audit reports do not signal valuable private information about the probability of bankruptcy, $\gamma_2\beta_2 = 0$. If $\gamma_2\beta_2 = 0$ it must also be true that $E[GQ_{it}\ v_{it}] = 0$, which implies that $\beta_3 = 0$. If reports do not signal valuable private information about the probability of bankruptcy, audit reports should not be useful for predicting bankruptcy after controlling for all publicly observable financial distress variables ($X_{it}$). Under the alternative hypothesis, a going-concern qualification is a signal of financial distress ($\gamma_2\beta_2 > 0$) and audit reports should be useful for identifying failing companies ($\beta_3 > 0$). Under the null hypothesis that large and small auditors' reports are equally informative, one should be unable to reject the null hypothesis that $\beta_3$ is the same for large and small auditors. Under the alternative hypothesis, large auditors' reports have greater incremental information content and $\beta_3$ is significantly more positive for large auditors than for small auditors.

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[3] This does not imply that a qualified report is necessarily equivalent to a prediction of bankruptcy. For example, if an auditor chooses a $P^*$ which is less than 0.5, qualified reports would be given to companies which the auditor believes are more likely to survive than fail. Table 5 shows that, on average, large (small) auditors give going-concern qualifications to companies whose bankruptcy probabilities exceed 18% (15%).

## 3. Data

### 3.1. *The sample*

An attempt was made to collect data on all publicly quoted UK companies between 1987–94.[4] For failing companies, data were collected from all accounts published from 1987 until the first public announcement of failure; for non-failing companies, data were collected in all available years between 1987–94.[5]

Firstly, information on companies' auditors and audit reports was collected from microfiche copies of companies' annual reports.[6] From each report, it was noted whether the auditor had given a qualified or unqualified audit opinion. When there is a significant possibility of the company ceasing to trade in the foreseeable future, the auditor is required to state that the accounts give a true and fair view subject to the company remaining a going concern. The 'Auditing Guideline on Going Concern' (August 1985) states: 'The going concern concept identified in Statement of Standard Accounting Practice No. 2 is "that the enterprise will continue in operational existence for the foreseeable future". This means in particular that the profit and loss account and the balance sheet assume no intention or necessity to liquidate...The foreseeable future should normally extend to a minimum of six months following the date of the audit report or one year after the balance sheet date whichever periods ends on the later date.'

In the sample, qualifications were given for fundamental uncertainties and non-compliance with Statements of Standard Accounting Practice (SSAPs) as well as for going-concern reasons.[7] Failing companies that received qualified reports more than one year prior to failure were included in the analysis so as to calculate type I and type II error rates for alternative bankruptcy horizons.[8] A list of companies that entered administration, receivership or liquidation was obtained from Stock Exchange Financial Yearbooks.[9] All such companies are defined in this paper as failing. Microfiche data were available for 1,086 companies of which 123 failed between 1987–94.

**Table 1**
**Financial health and audit reporting (1987-94)**

| | *1987* | *1988* | *1989* | *1990* | *1991* | *1992* | *1993* | *1994* | *Total* |
|---|---|---|---|---|---|---|---|---|---|
| $S_t$ | 799 | 862 | 903 | 927 | 925 | 908 | 897 | 883 | 7,104 |
| $F_t$ | 4 | 5 | 6 | 36 | 46 | 41 | 15 | 7 | 160 |
| $NFAILS_t$ | 5 | 13 | 31 | 35 | 26 | 8 | 3 | 2 | 123 |
| $NGQ_t$ | 1 | 3 | 3 | 20 | 27 | 26 | 22 | 21 | 123 |

$S_t$ = Number of observations in year t for which microfiche data were available.
$F_t$ = Number of UK publicly quoted companies in the population which entered bankruptcy in year t.
$NFAILS_t$ = Number of companies in the sample which issued their final annual reports in year t, prior to entering bankruptcy.
$NGQ_t$ = Number of companies which received going concern qualifications in year t.

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[4] A UK company is so defined if its headquarters and auditor were based in the UK. Many of the companies in the sample had overseas operations and overseas shareholders.

[5] There were no cases where failing companies issued accounts after the first public announcement of failure.

[6] These are located in the Corporate Information Library at Warwick University. Data on companies that were taken over were collected up to the point of takeover, and thereafter these companies were treated as missing observations.

[7] 'Fundamental uncertainties' arose where auditors were uncertain about provisions made for tax, slow-moving stocks, bad debts or litigation—72 companies received qualified reports for issues other than going-concern while 17 companies received reports that were qualified for both going-concern and non-going-concern issues. The former were coded with a zero, while the latter were coded with a one.

[8] For example, a qualification two periods prior to failure is classified as a type II error when the bankruptcy horizon is one period and is classified as an accurate report when the horizon is two or more periods. Longer bankruptcy horizons have the disadvantage that there is a greater probability of mis-classifying a type II error as an accurate report. As shown in Table 2, the conclusions of this study are not sensitive to different bankruptcy horizons.

[9] In the UK, there are three types of reorganisation procedure when a company becomes insolvent—liquidation, receivership and administration. In a liquidation, the assets of the company are sold so as to meet the claims of creditors. In a receivership, the receiver can decide whether it is in the creditors' interests to sell the company's assets. Generally, it is in the creditors' interests to liquidate if the liquidation value of the company exceeds its going concern value. The possibility of administration was introduced by the 1986 Insolvency Act in an attempt to reduce the number of inefficient liquidations. However, few administrators have been appointed compared to the numbers of companies entering receivership or liquidation. The results in this paper are not sensitive to different kinds of reorganisation procedures.

Next, a search was made of Datastream for data on the number of employees, cashflow ratios, profitability ratios and leverage ratios.[10] Data on each company's Standard Industrial Classification (SIC) codes were collected from Extel, because industry sector is likely to be an important determinant of bankruptcy. Data for some of the 1086 companies in the initial sample were unavailable from Datastream and Extel. The final sample comprised 976 companies of which 90 failed over the eight-year period. The frequency of failure in the sample is 1.73% which is approximately equal to the population frequency (Morris, 1997).

### *3.2. Bankruptcy and audit reporting between 1987–94*

Table 1 shows the pattern of bankruptcy and audit reporting over the period 1987–94. Row 1 shows the total number of companies for which audit data were available in the initial sample of 1,086 companies. The number of companies in the final sample (976) exceeds the number of observations in each year due to missing observations.[11] Row 2 shows the number of failing companies in the population. Given the timing of the economic cycle, it is unsurprising that most failures occurred between 1990–92. A comparison of rows 2 and 3 shows that there is an average lag of around a year between the last annual report of a failing company (FAILS$_t$) and its entry into bankruptcy (F$_t$).[12] Companies which received going-concern qualifications were coded with a 1, whilst those that did not were coded with a zero. Row 4 shows that the number of going-concern qualifications jumped up in 1990 and remained high during the recovery of 1993–94.

### *3.3. The accuracy of large and small auditors' reports*

Panel A of Table 2 shows that both type I and type II error rates are smaller for large audit firms than for small audit firms. The difference in type I error rates was statistically significant at the 10% level, while the difference in type II error rates was not significant. Panel B reports the accuracy rate which is equal to the number of type I and type II errors divided by the total number of reports. For example, large auditors committed 42 type I errors and 58 type II errors in 4511 audit reports; therefore the accuracy rate for large auditors is 97.78% [(4511–42–58)/4511]. The results indicate that the reports of large auditors were significantly more accurate than those of small auditors (at the 1% level). The difference in large and small auditors' accuracy rates was highly significant because *both* type I *and* type II error rates were lower for large auditors.[13]

In panels A and B the bankruptcy horizon was assumed to be a single reporting period—this definition makes sense because of the Auditing Guideline's definition of the 'foreseeable future'. However, the result that large auditors' reports are more accurate is robust to considering alternative bankruptcy horizons. Panel C measures the accuracy of reports when the horizon is two reporting periods (a type I error occurs when a failing company does not receive a qualification in its final or penultimate reports; a type II error occurs when a qualified report is not followed by bankruptcy within two reporting periods). Once again, large auditors' reports were significantly more accurate than small auditors' reports—similar results were found for bankruptcy horizons of more than two periods.

The superior accuracy of large auditors' reports could have occurred because large auditors were more accurate or because it was easier to predict bankruptcy for large auditors' clients. For example, large auditors' clients tend to be large and are unlikely to fail. Therefore, a bankruptcy model was used as a benchmark for evaluating the accuracy of audit reports. If it is easier to predict bankruptcy for large auditors' clients, one should find that the bankruptcy model is more accurate for large auditors' clients. If large auditors are

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[10] These variables are defined in Table 3.

[11] Companies with observations that were missing for reasons other than bankruptcy or take-over were not dropped from the sample because this could cause problems of sample selection bias. There are two reasons why the presence of missing observations is not likely to cause problems. First, there are not very many missing observations—the majority of companies (653) have a complete panel of data covering all eight years. Secondly, when the sample proportion of companies differs from the population proportion, the logit model has consistent coefficient estimates for all variables except the constant (Anderson, 1972). For all models reported in this paper, the results from probit and logit models were found to be very similar and so sample selection bias does not seem to be a problem.

[12] The average lag was in fact 14 months.

[13] When large and small auditors' clients were matched on the basis of size, large auditors' reports were again found to be more accurate than those of small auditors. The data were partitioned into three groups:

Group 1: Company has $\leq$15,000 employees and hires a large auditor (3,971 observations)
Group 2: Company hires a small auditor (1,905 observations)
Group 3: Company has $>$15,000 employees and hires a large auditor (540 observations)

The mean number of employees in Groups 1, 2 and 3 were 2,076, 2,081 and 52,556 respectively. If auditor accuracy depends on company size rather than auditor size, one would expect to find no difference in accuracy rates for Groups 1 and 2 which have similar size companies. In Group 1, the type I and type II error rates (76.36% and 1.48%) were both lower than small auditors' error rates (91.43% and 1.76%). The difference between large and small auditors' type I error rates was statistically significant at the 10% level ($\chi^2 = 3.32^*$), while the difference between type II error rates was not significant. These results are similar to those reported in Table 2, where companies were not sorted into size groups.

**Table 2**
**The correlation between auditor accuracy and auditor size**

*Panel A* *Type I and Type II error rates of large and small audit firms (Bankruptcy horizon = 1 year)*

| | Large audit firms ($AUD_{it} = 1$) | | Small audit firms ($AUD_{it} = 0$) | | $H_0$: equal error rates for large and small audit firms |
|---|---|---|---|---|---|
| | $GQ_{it} = 0$ | $GQ_{it} = 1$ | $GQ_{it} = 0$ | $GQ_{it} = 1$ | |
| $FAILS_{it} = 1$ | 42 | 13 | 32 | 3 | |
| Type 1 error (%) | 76.36 | | 91.43 | | $\chi 2 = 3.28$* |
| $FAILS_{it} = 0$ | 4,398 | 58 | 1,837 | 33 | |
| Type II error (%) | 1.30 | | 1.76 | | $\chi^2 = 1.92$ |

*Panel B* *Overall accuracy of large and small audit firms (bankruptcy horizon = 1 year)*

| | Large audit firms ($AUD_{it} = 1$) | | Small audit firms ($AUD_{it} = 0$) | | $H_0$: equal accuracy for large and small audit firms |
|---|---|---|---|---|---|
| | Accurate | Inaccurate | Accurate | Inaccurate | |
| | 4,411 | 100 | 1,840 | 65 | |
| Accuracy (%) | 97.78 | | 96.59 | | $\chi^2 = 7.63$*** |

*Panel C* *Overall accuracy of large and small audit firms (bankruptcy horizon = 2 years)*

| | Large audit firms ($AUD_{it} = 1$) | | Small audit firms ($AUD_{it} = 0$) | | $H_0$: equal accuracy for large and small audit firms |
|---|---|---|---|---|---|
| | Accurate | Inaccurate | Accurate | Inaccurate | |
| | 4,360 | 151 | 1,813 | 92 | |
| Accuracy (%) | 96.65 | | 95.17 | | $\chi^2 = 13.00$*** |

*Significant at the 0.1 level ($\chi^2_{0.1}$ (1 d.f.) = 2.71)
**Significant at the 0.05 level ($\chi^2_{0.05}$ (1 d.f.) = 3.84)
***Significant at the 0.01 level ($\chi^2_{0.01}$ (1 d.f.) = 6.63)
When the bankruptcy horizon is one year, the failure variable is $FAILS_{it}$
$FAILS_{it} = 1$ if company i issued its final report in year t prior to entering bankruptcy (90 observations); = 0 otherwise (6,326) observations).
When the bankruptcy horizon is two years, the failure variable is $FAILS_{i(t,t+1)}$.
$FAILS_{i(t,t+1)} = 1$ if company i issued its final or penultimate report in year t prior to entering bankruptcy (178 observations); = 0 otherwise (6,238 observations)
$GQ_{it} = 1$ if company i received a going-concern qualification in year t (107 observations); = 0 otherwise (6,309 observations)
$AUD_{it} = 1$ if company was audited by a Big Six auditor in year t; = 0, otherwise

more accurate than small auditors, one should find that large auditors' reports are more accurate, even taking into account differences between large and small auditors' clients. The explanatory variables included in the model are described in the next section.

### 3.4. *Financial distress variables*

Data on the main activities of each company were collected because the effects of the economic cycle are likely to differ across industry sectors. Previous research also indicates that cashflow, leverage, profitability and company size are related to financial distress (Altman, 1986). Data on these variables were obtained from Datastream and are defined in Table 3.[14]

The return on capital variable ($ROC_{it}$) measures profitability whilst capital gearing ($CAPG_{it}$) is a measure of leverage. The gross cashflow ($GCF_{it}$),

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[14] Some studies used total assets rather than number of employees to measure company size. However, assets were found to have lower predictive content than the number of employees.

**Table 3**
**Company size, industry sector, cashflow, leverage and profitability variables**

| *Variable* | *Definition* | *Datastream Code* | *Interpretation* |
|---|---|---|---|
| $EMP_{it}$ | Total number of employees | 219 | Company size |
| D1 | =1 if company i operates in energy or water; =0 otherwise | | Industry effects |
| D5 | = 1 if company i operates in construction; = 0 otherwise | | Industry effects |
| D8 | =1 if company i operates in banking, finance or insurance; =0 otherwise | | Industry effects |
| $DBTN_{it}$ | $\frac{\text{(Total sales)} \times 100}{\text{Total debtors}}$ | 726 | Debtor turnover ratio |
| $CASH_{it}$ | $\frac{\text{(Total cash)} \times 100}{\text{Current liabilities}}$ | 743 | Cash ratio |
| $GCF_{it}$ | $\frac{\text{(Profits earned for ordinary shareholders+Depreciation+Tax equalisation)}}{\text{Capital employed+Current liabilities} - \text{Intangibles}} \times 100$ | 735 | Gross cashflow ratio |
| $CAPG_{it}$ | $\frac{\text{(Preference capital+Subordinated debt+Loan capital+Short-term borrowings)}}{\text{Capital employed+Short-term borrowing} - \text{Intangibles}} \times 100$ | 731 | Capital gearing ratio |
| $ROC_{it}$ | $\frac{\text{(Total interest charged+Pre-tax profit)}}{\text{Capital employed+Short-term borrowing} - \text{Intangibles}} \times 100$ | 707 | Return on capital ratio |

debt-turnover ($DBTN_{it}$) and cash ($CASH_{it}$) ratios measure cashflow. $GCF_{it}$ measures profit-generated cashflow. $DBTN_{it}$ captures the fact that companies are more likely to fail if they are having problems in receiving payments for past sales. $CASH_{it}$ is a measure of short-term liquidity. Other Datastream financial ratios tried were income gearing (leverage measure), credit-turnover, stock-turnover, the working capital ratio and the quick ratio (cashflow measures).[15] These variables were found to have insignificant and/or non-constant effects on bankruptcy and were therefore omitted from the model.

## 4. Results

Table 4 reports the results for two bankruptcy models. Model 1 is used to evaluate the accuracy of audit reports while model 2 tests the incremental information content of going-concern qualifications. Both models show that cashflow ($GCF_{it}$) and leverage ($CAPG_{it}$) have non-linear effects on the probability of bankruptcy—these non-linearities were captured by including polynomial variables ($CAPG_{it}^2$, $CAPG_{it}^3$ and $CAPG_{it}^4$ and $GCF_{it}^2$). Lennox (1999) has shown that a failure to take account of these non-linearities causes heteroscedasticity problems.[16]

The negative coefficients on company size ($EMP_{it}$) indicate that small companies were more likely to fail. The industry dummies show bankruptcy was more likely for companies operating in the utility ($D1_i$), construction ($D5_i$) or finance ($D8_i$) sectors. The negative coefficients on the debtor-turnover ($DBTN_{it}$) and cash ($CASH_{it}$) ratios show that companies were more likely to fail if payments from past sales were low or if cash reserves fell. The negative coefficients on gross cashflow ($GCF_{it}$)

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[15] All these ratios are defined by Datastream, and have the following codes: Income gearing (Datastream code, 732); Creditors' turnover (728); Stock turnover (724); Working capital ratio (741); and the Quick ratio (742).

[16] Langrange Multiplier tests for omitted variable bias and heteroscedasticity show that the bankruptcy model does not suffer from mis-specification problems. Lennox (1999) also tested the model using separate estimation (1987–90) and hold-out (1991–94) samples, and found that the coefficient estimates are stable over the period 1987–94. Standard errors were calculated using the Huber bootstrapping technique which gives consistent standard errors under very weak assumptions; for example, the formula does not require the standard assumptions of no serial correlation or homoscedasticity (Huber, 1967). Huber's formula is a canned part of the STATA statistical package and can be used in conjunction with the probit command.

**Table 4**
**Bankruptcy models**
**(z-statistics in parentheses)**

| *Control variables* | *Model 1* | *Model 2* |
|---|---|---|
| $EMP_{it}$ | -0.379e-04 | -0.110e-05 |
| | (-2.581)*** | (-0.064) |
| $AUD_{it}$* $EMP_{it}$ | | -0.606e-04 |
| | | (-2.634)*** |
| $D1_i$ | 0.432 | 0.439 |
| | (1.810)* | (1.869)* |
| $D5_i$ | 0.328 | 0.368 |
| | (2.506)** | (2.740)*** |
| $D8_i$ | 0.398 | 0.406 |
| | (3.754)*** | (3.790)*** |
| $DBTN_{it}$ | -0.200e-03 | -0.186e-03 |
| | (-2.010)** | (-1.837)* |
| $CASH_{it}$ | -0.472e-02 | -0.435 |
| | (-2.325)** | (-2.087)** |
| $GCF_{it}$ | -0.215e-03 | -0.902e-02 |
| | (-2.340)** | (-1.334) |
| $GCF_{it}^2$ | -0.205e-03 | -0.191e-03 |
| | (-2.072)** | (-1.764)* |
| $CAPG_{it}$ | 0.245e-03 | 0.254e-03 |
| | (7.698)*** | (8.046)*** |
| $CAPG_{it}^2$ | -0.845e-08 | -0.877e-08 |
| | (-5.344)*** | (-5.435)*** |
| $CAPG_{it}^3$ | 0.587e-13 | 0.613e-13 |
| | (4.802)*** | (4.914)*** |
| $CAPG_{it}^4$ | -0.112e-18 | -0.118e-18 |
| | (-4.491)*** | (-4.630)*** |
| $ROC_{it}$ | -0.323e-04 | -0.414e-04 |
| | (-1.771) | (-1.559) |
| $AUD_{it}$ | | -0.150 |
| | | (-1.320) |
| CONSTANT | -2.822 | -2.806 |
| | (-19.519)*** | (-18.462)*** |
| *Experimental Variables* | | |
| $GQ_{it}$ | | -0.398 |
| | | (-1.135) |
| $AUD_{it}$* $GQ_{it}$ | | 0.777 |
| | | (1.948)* |
| Number of Observations | 6416 | 6416 |
| Number of companies | 976 | 976 |

***Significant at the 0.01 level. **Significant at the 0.05 level. *Significant at the 0.1 level.
All variables defined in Tables 2 and 3.

also show that a company was more likely to go bankrupt when profit-generated cashflow was low.

The positive coefficient on capital gearing ($CAPG_{it}$) shows that highly-levered companies were more likely to fail. While the polynomial terms $CAPG_{it}^2$ and $CAPG_{it}^4$ have negative coefficients, the effect of leverage on bankruptcy was monotonically positive for values of $CAPG_{it}$ lying within two standard deviations of its mean. Finally, the negative coefficient on profitability ($ROC_{it}$) implies that companies with low (or negative) profits were more likely to fail.

Table 5 compares model 1's predictive accuracy for large and small auditors' clients to investigate whether the positive correlation between auditor accuracy and auditor size is due to client-specific or auditor-specific factors. Panel A reports the type I and type II error rates for auditors and model 1 (auditors' error rates are the same as Panel A of Table 2). The cut-off probabilities (P*)

**Table 5**
**Predictive accuracy of audit reports and model 1 for large and small auditors' clients**

*Panel A* — *Type I and Type II error rates of large and small audit firms*

| | Large audit firms ($AUD_{it}=1$) | | Small audit firms ($AUD_{it}=0$) | | $H_0$: equal error rates for large and small audit firms |
|---|---|---|---|---|---|
| | $GQ_{it}=0$ | $GQ_{it}=1$ | $GQ_{it}=0$ | $GQ_{it}=1$ | |
| $FAILS_{it}=1$ | 42 | 13 | 32 | 3 | |
| Type I error (%) | 76.36 | | 91.43 | | $\chi^2=3.28$* |
| $FAILS_{it}=0$ | 4,398 | 58 | 1,837 | 33 | |
| Type II error (%) | 1.30 | | 1.76 | | $\chi^2=1.92$ |

*Type I and Type II error rates of model 1*

| | Large audit firms' clients ($AUD_{it}=1$) | | Small audit firms' clients ($AUD_{it}=0$) | | $H_0$: equal error rates for large and small audit firms' clients |
|---|---|---|---|---|---|
| Cut-off (P*) | 0.187 | | 0.151 | | |
| | SURVIVE | FAIL | SURVIVE | FAIL | |
| $FAILS_{it}=1$ | 40 | 15 | 27 | 8 | |
| Type I error (%) | 72.73 | | 77.14 | | $\chi^2=0.22$ |
| $FAILS_{it}=0$ | 4,400 | 56 | 1,842 | 28 | |
| Type II error (%) | 1.26 | | 1.50 | | $\chi^2=0.58$ |

*Panel B* — *Overall accuracy of large and small audit firms*

| | Large audit firms ($AUD_{it}=1$) | | Small audit firms ($AUD_{it}=0$) | | $H_0$: equal accuracy for large and small audit firms |
|---|---|---|---|---|---|
| | Accurate | Inaccurate | Accurate | Inaccurate | |
| | 4411 | 100 | 1840 | 65 | |
| Accuracy (%) | 97.78 | | 96.59 | | $\chi^2=7.63$*** |

*Overall accuracy of model 1*

| | Large audit firms' clients ($AUD_{it}=1$) | | Small audit firms' clients ($AUD_{it}=0$) | | $H_0$: equal accuracy for large and small audit firms' clients |
|---|---|---|---|---|---|
| Cut-off (P*) | 0.187 | | 0.151 | | |
| | Accurate | Inaccurate | Accurate | Inaccurate | |
| | 4,415 | 96 | 1,850 | 55 | |
| Accuracy (%) | 97.87 | | 97.11 | | $\chi^2=3.36$* |

*Significant at the 0.1 level ($\chi^2_{0.1}$ (1 d.f.) = 2.71).
**Significant at the 0.05 level ($\chi^2_{0.05}$ (1 d.f.) = 3.84)
***Significant at the 0.01 level ($\chi^2_{0.01}$ (1 d.f.) = 6.63)
$FAILS_{it}=1$ if company i issued its final report in year t prior to entering bankruptcy (90 observations); = 0 otherwise (6,326) observations).
$GQ_{it}=1$ if company i received a going-concern qualification in year t (107 observations); = 0 otherwise (6309 observations).

for model 1 were chosen such that the number of predicted bankruptcies was equal to the number of going-concern qualifications. Since large auditors gave 71 (13+58) going-concern qualifications, the cut-off probability for large auditors' clients was 0.187, as this resulted in 71 predictions of failure by model 1. Similarly, small auditors gave 36 going-concern qualifications and the cut-off probability for small auditors' clients was 0.151. This rule for choosing P* ensured that model 1 reflected the degree of auditor conservatism. Choosing a lower (higher) P* would increase (reduce) the number of predicted failures. Since most companies are non-failing, choosing a lower (higher) P* would artificially reduce (increase) model 1's accuracy compared to audit reports.

There are three things to note from Table 5. First, model 1 was more accurate than both large and small auditors' reports. Model 1's type I and type II error rates for large auditors' clients were 72.73% and 1.26%, while the error rates of large auditors were 76.36% and 1.30% respectively. Model 1's type I and II error rates for small auditors' clients were 77.14% and 1.50%, while the error rates of small auditors were 91.43% and 1.76% respectively. This is consistent with previous research showing that audit reports are poor indicators of financial distress compared to bankruptcy models (Koh, 1991).

Secondly, the bankruptcy model was more accurate for large auditors' clients than for small auditors' clients. Model 1's type I and type II error rates were 72.73% and 1.26% for large auditors' clients, but 77.14% and 1.50% for small auditors' clients. This indicates that it is easier to predict bankruptcy for large auditors' clients than small auditors' clients. This demonstrates the importance of controlling for differences in client characteristics when comparing the accuracy of large and small auditors.

Finally, Panel B shows that large auditors were significantly more accurate than small auditors, even after controlling for client characteristics. The difference in reporting accuracy between large and small auditors was highly significant (at the 1% level), while the difference in model 1's accuracy between large and small auditors' clients was less significant (at the 10% level). While model 1 classified 8 (0.18%) companies more accurately than large auditors, it classified 20 (1.05%) companies more accurately than small auditors. Had model 1's superior accuracy been the same for both large and small auditors' clients, one would have expected these numbers to be 19.7 and 8.3 respectively (rather than 8 and 20). One can reject the null hypothesis that model 1 is equally more accurate for large and small auditors' clients at the 5% level ($\chi^2 = 6.40^{**}$). Since model 1's superior accuracy is significantly greater for small auditors' clients, the evidence indicates that large auditors were significantly more accurate.

Model 2 in Table 4 tests whether audit reports signal useful incremental information about the probability of bankruptcy by including going-concern qualifications ($GQ_{it}$) as a predictor. To investigate whether the information content of audit reports is related to auditor size, $GQ_{it}$ is interacted with an auditor size dummy ($AUD_{it}$) which takes a value of one if the auditor belonged to the Big Six.

Prior to estimating model 2, model 1 was re-estimated for large and small auditors' clients to investigate any differences in coefficient estimates. The relationship between client size ($EMP_{it}$) and bankruptcy was found to be greater for large auditors' clients than small auditors' clients. Therefore, a variable capturing the interaction between client and auditor size ($AUD_{it}*EMP_{it}$) is included in model 2. The insignificant negative coefficient on going-concern qualifications ($GQ_{it}$) shows that audit opinions did not signal useful incremental information about the probability of bankruptcy. The positive coefficient on the interaction variable ($AUD*GQ_{it}$) is significant at the 10% level (but not the 5% level). Although large auditors' going-concern qualifications may have signalled useful information about the probability of bankruptcy, the statistical significance was not high. The standard errors for the coefficients on $GQ_{it}$ and $AUD_{it}*GQ_{it}$ were 0.351 and 0.399, respectively. Thus, the difference between the coefficients on $GQ_{it}$ (−0.398) and on $AUD_{it}*GQ_{it}$ (0.777) were statistically significant at the 5% level—one can reject the null hypothesis that large and small auditors' going-concern qualifications had equal information content.

## 5. Conclusion

Large auditors are significantly more likely to give going-concern qualifications to failing companies and clean opinions to non-failing companies. Results from a bankruptcy model suggest that this is partly because it is easier to predict bankruptcy for large auditors' clients than for small auditors' clients. However, even after controlling for differences between large and small auditors' clients, large auditors give significantly more accurate reports compared to small auditors. The incremental information content of audit reports was tested by including going-concern qualifications in the bankruptcy model. While the statistical significance of large auditors' reports was weak, they were significantly better predictors of bankruptcy compared to small auditors' reports. A caveat to the methodology of this and previous papers is that going-concern qualifications are not equivalent to bankruptcy predictions by auditors—thus, the correlation between audit opinions and bankruptcy outcomes may not fully capture differences in accuracy.

Overall, the results are consistent with the reputation and deep pockets theories, which predict that large auditors have more incentive to exert effort in order to avoid issuing inaccurate reports. An alternative explanation, unrelated to effort or reporting incentives, is that large auditors are more competent at obtaining or interpreting audit evidence. For example, large audit firms may have more staff with client-specific knowledge, they may be more experienced in auditing large quoted companies, or they may engage in greater industry specialisation. Future research therefore needs to investigate whether the superior accuracy of large auditors is due to their deeper pockets, reputation effects or greater competence.

## References

Altman, E. (1986). 'Financial ratios, discriminant analysis and the prediction of corporate bankruptcy', in Johnson, R. (ed.), *Issues and readings in managerial finance*. New York: Dryden Press.

Altman, E. and McGough, T. (1974). 'Evaluation of a company as a going concern'. *Journal of Accountancy*: 51–57.

Anderson, J. (1972). 'Separate sample logistic discrimination'. *Biometrika* 59: 19–35.

Balvers, R., McDonald, B. and Miller, R. (1988). 'Underpricing of new issues and the choice of auditor as a signal of investment banker reputation'. *The Accounting Review*, 63: 605–621.

Beatty, R. (1989). 'Auditor reputation and the pricing of initial public offerings'. *The Accounting Review*, 64: 693–709.

Datar, S., Feltham, G. and Hughes, J. (1991). 'The role of audits and audit quality in valuing new issues'. *Journal of Accounting and Economics*, 14: 3–49.

DeAngelo, L. (1981). 'Auditor size and audit quality'. *Journal of Accounting and Economics*, 3: 183–199.

DeFond, M. (1992). 'The association between changes in client firm agency costs and auditor switching'. *Auditing: A Journal of Theory and Practice*, 11: 16–31.

Dye, R. (1993). 'Auditing standards, legal liability and auditor wealth'. *Journal of Political Economy*, 101: 887–914.

Eichenseher, J., Hagigi, M. and Shields, D. (1989). 'Market reaction to auditor changes by OTC companies'. *Auditing: A Journal of Practice and Theory*, 9: 29–40.

Firth, M. and Smith, A. (1992). 'Selection of auditor firms by companies in the new issue market'. *Applied Economics*, 24: 247–255.

Francis, J. and Wilson, E. (1988). 'Auditor changes: A joint test of theories relating to agency costs and auditor differentiation'. *The Accounting Review*, 63: 663–682.

Grout, P., Jewitt, I., Pong, C. and Whittington, G. (1994). 'Auditor professional judgement: Implications for regulation and the law'. *Economic Policy*, 19: 307–344.

Hopwood, W., McKeown, J. and Mutchler, J. (1989). 'A test of the incremental explanatory power of opinions qualified for consistency and uncertainty'. *The Accounting Review*, 64: 28–48.

Huber, P. (1967). 'The behaviour of maximum likelihood estimates under non-standard conditions'. *Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability*, 1: 221–233.

Johnson, W. and Lys, T. (1990). 'The market for audit services: Evidence from voluntary auditor changes'. *Journal of Accounting and Economics*, 12: 281–308.

Koh, H. (1991). 'Model predictions and auditor assessments of going concern status'. *Accounting and Business Research*, 21: 331–338.

Lennox, C. (1999). 'Identifying failing companies: A re-evaluation of the logit, probit and DA approaches'. *Journal of Economics and Business* (forthcoming).

Menon, K. and Williams, D. (1991). 'Auditor credibility and initial public offerings'. *The Accounting Review*, 66: 313–332.

Morris, R. (1997). *Early warning indicators of corporate failure: A critical review of previous research and further empirical evidence*. Ashgate Publishing in association with the ICAEW.

Nichols, D. and Smith, D. (1983). 'Auditor credibility and auditor changes'. *Journal of Accounting Research*, 21: 534–544.

Schwartz, K. and Soo, B. (1995). 'An analysis of form 8-K disclosures of auditor changes by firms approaching bankruptcy'. *Auditing: A Journal of Practice and Theory*, 14: 125–136.

Simunic, D. and Stein, M. (1987). 'Production differentiation in auditing: A study of auditor choice in the market for new issues'. *Canadian Certified General Accountants' Research Foundation*.

Titman, S. and Trueman, B. (1986). 'Information quality and the valuation of new issues'. *Journal of Accounting and Economics*, 8: 159–172.

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# The management of foreign currency risk: derivatives use and the natural hedge of geographic diversification

**Stephen D. Makar, Jay DeBruin and Stephen P. Huffman***

**Abstract**—This study investigates how large US multinational companies use foreign exchange derivatives (FXDs) to manage currency risk. The study tests whether a company's use of FXDs is associated with its exposure to changing exchange rates, and whether such risk management practices are affected by the company's degree of geographic diversification indicative of natural hedging. To date, the empirical evidence on the use of derivatives by large companies is limited, and the impact of geographic diversification on FXD use, in particular, has not been investigated. This study addresses such a gap in the literature and provides results that are consistent with expectations. Specifically, the evidence indicates that large companies' FXD use increases with the level of foreign currency exposure as well as with the degree of geographic concentration indicative of using less natural hedging. Evidence consistent with economies of scale in FXD use is also provided.

## 1. Introduction

This study investigates how companies manage their exposure to changing foreign currency exchange rates. In recent years, multinational companies (MNCs) have turned increasingly to derivatives to reduce or hedge such currency risk.[1] Responding to the dramatic increase in derivatives use, the Financial Accounting Standards Board (FASB) has issued a series of pronouncements that expand the disclosure requirements for derivatives and other financial instruments.[2] Unlike prior studies, which have been limited primarily to survey data (Berkman and Bradbury, 1996), the current study takes advantage of these recent disclosures to consider large US MNCs' use of FXDs in hedging currency risk.

Employing survey methodology, previous researchers have struggled to explain how large MNCs manage their exposure to changing exchange rates (Nance, Smith and Smithson, 1993). On the one hand, survey studies have found that large companies face higher currency risk (see Phillips, 1995) and use more FXDs (see for example, Bodnar, Hayt and Marston, 1996). In addition, prior studies have provided survey evidence consistent with large companies achieving information and transaction cost scale economies in using FXDs (see for example, Nance et al., 1993). On the other hand, survey research has noted that large companies are more likely to have multiple operations and thus benefit from the natural hedge associated with geographic diversification (see Houston and Mueller, 1988).[3] In sum, the empirical evidence on large US MNCs' use of FXDs is limited (Geczy, Minton and Schrand, 1997), and the relationship between FXD use and

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[1] The notional amount of outstanding derivatives worldwide has now reached some $70 trillion (Cheney, 1997), a 10-fold increase from 1989 (US Securities and Exchange Commission, 1997).

[2] As part of its financial instruments project which began in 1986, the FASB has issued Statement of Financial Accounting Standards (SFAS) 105 (Financial Accounting Standards Board, 1990), SFAS 107 (Financial Accounting Standards Board, 1991) and SFAS 119 (Financial Accounting Standards Board, 1994). Similarly, the US Securities and Exchange Commission adopted new disclosure rules in January 1997 (US Securities and Exchange Commission, 1997). In a move from the disclosure phase of their project, the FASB recently issued SFAS 133, entitled 'Accounting for Derivatives Instruments and Hedging Activities' (Financial Accounting Standards Board, 1998). The FASB's approach to accounting for hedging activities has been criticised for being inconsistent with risk management practices, including the use of natural hedges (see Linsmeier et al., 1997). SFAS 133 is effective after 15 June 1999.

[3] In a natural hedge, a company may alter its operations to manage currency risk. By diversifying to countries whose currencies do not track each other closely, the company benefits from offsetting exposures to changing exchange rates (Houston and Mueller, 1988). Such currency diversification is similar to the modern portfolio theory concept of diversification. Geographic diversification also allows the MNC to shift its sales and production operations among locations to hedge currency risk (Broll, 1992).

the geographic diversification natural hedge is an open question.

This study extends the prior research by employing recently available data to examine large US MNCs' use of FXDs in relation to the company's currency risk. Moreover, we investigate whether such risk management practices are affected by the company's degree of geographic diversification indicative of a natural hedge. To date, empirical studies of FXD use have not incorporated a measure of this hedging technique. We also provide evidence on scale economies in FXD use. The FASB has emphasised that such research on issues currently under debate is critical to the standard setting process (Beresford and Johnson, 1995). Given the contentious nature of the derivatives debate in particular (see for example, Greenspan, 1997), the examination of US MNCs' currency risk management practices is especially critical.

Section 2 provides background to investigating MNCs' currency risk management practices, including a brief summary of prior research. Section 3 discusses the formal hypotheses and research method. The results are reported in Section 4. The final section offers a summary and conclusions.

## 2. Background

As introduced above, prior studies have employed survey methodology to examine MNCs' management of currency risk.[4] While such methodology is subject to limitations (see Kerlinger, 1986), these studies have consistently found that US MNCs behave primarily in a risk averse manner (see for example, Rodriguez, 1981; Mathur, 1982; Collier, et al., 1990; Bodnar et al., 1995). Moreover, the survey research indicates that currency risk is an increasing function of company size (see Phillips, 1995) and that large US MNCs are major users of FXDs (see Bodnar et al., 1995; 1996). In sum, this survey evidence is consistent with a hedging strategy. However, Belk and Glaum (1990) caution that while MNCs can be described as risk averse, the management of currency risk is affected by additional factors such as the risk management practices of competitors. Similarly, theoretical researchers have noted that a company's optimal hedging strategy depends in part on its competitors' hedging practices (see Froot, Scharfstein and Stein, 1993). These studies highlight the importance of considering industry effects when examining MNCs' use of FXDs.

Nance et al. (1993) also employ survey methodology to examine the use of FXDs by US MNCs. These authors conclude that the cumulative evidence is consistent with information and transaction cost scale economies in FXD use. Similarly, more recent studies have reviewed annual report disclosures to provide evidence of such economies of scale (see Berkman and Bradbury, 1996; Mian, 1996; Geczy et al., 1997). Large companies benefit from the information scale economies associated with the availability of qualified personnel to manage sophisticated derivative programs (Booth, Smith and Stolz, 1984). In addition, large MNCs are able to take advantage of the economies of scale in FXD transaction costs (Nance, et al., 1993).

While prior research has consistently found evidence of positive size effects in FXD use, the risk management practices of large US MNCs are not fully understood (Nance et al., 1993). This lack of understanding has been attributed in part to inadequate public information on FXD use. Responding to the need for improvements in disclosure policy, the FASB issued SFAS 119 (1994), noting 'that more disclosure about derivative financial instruments is needed because they are increasingly important in business and finance but are as yet not well understood' (para. 4). Among the improved and expanded disclosure requirements under SFAS 119, MNCs are encouraged to provide information that is useful in understanding and evaluating a company's risk management strategies and objectives (para. 12).[5] SFAS 119 was effective after 15 December 1994 for companies with $150 m. or more in total assets. The effective date was delayed one year for smaller companies.

The limited understanding of large MNCs' FXD use also may be due to the difficulty in operationalising variables of interest. For example, the size of a company is often correlated with other company attributes, and is thus subject to construct validity concerns (Ball and Foster, 1982). Moreover, previous studies caution that the predicted impact of company size on FXD use is indeterminate (see for example, Berkman and Bradbury, 1996). Although large companies face greater currency risk and are more likely to benefit from economies of scale in FXD use, they also may benefit from the natural hedge associated with the geographic diversification of multiple foreign operations (Houston and Mueller, 1988).[6] While acknowledging the existence of natural hedges, most prior studies have treated this alternative risk management technique as predetermined in order to focus on FXD use (see for example, Nance et al., 1993; Berkman and Bradbury, 1996). In particular, such research has yet to incorporate a measure of the geographic diversification natural hedge.

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[4] A MNC's total currency risk can be decomposed into translation, transaction and competitive risk (see for example, Collier and Davis, 1985). Exchange rate changes result in translation gains or losses when foreign currency denominated financial statements are converted to US dollars. In contrast, changes in exchange rates subsequent to the date of a foreign currency dominated transaction result in gains or losses at the date the fixed foreign currency amount is remitted. Exchange rate movements also can have a substantial effect on the profitability of both multinational and domestic companies by altering competitive conditions.

[5] For example, the *1995 Annual Report* of Allied Signal notes that 'the Company attempts to have all such transaction exposure hedged with internal natural hedges to the fullest extent possible'. As part of our study, a careful reading of SFAS 119 disclosures indicated that specific discussions of natural hedges are infrequent, and when such discussions are provided (as in the case of Allied Signal), the information is qualitative in nature.

## 3. Hypotheses and research method

### 3.1. Hypotheses

As summarised in the prior section, empirical research on large US MNCs' use of FXDs is limited, and, more generally, these companies' currency risk management practices are not well understood. This paper contributes to the literature by investigating the relationship between a company's use of FXDs and its foreign currency exposure, and by considering whether such risk management practices are affected by its degree of geographic diversification indicative of a natural hedge. Specifically, we take advantage of recently available annual report disclosures by large US MNCs to test the following hypotheses (in alternative form):

**H1a:** There is a significant and positive relationship between the use of foreign exchange derivatives and *the level of foreign currency exposure*, for a given degree of geographic concentration and company size.

**H2a:** There is a significant and positive relationship between the use of foreign exchange derivatives and *the degree of geographic concentration*, for a given level of foreign currency exposure and company size.

We expect that the higher the level of foreign currency exposure, the more the company will use FXDs, *ceteris paribus*. Similarly, the more geographically concentrated the company, the less the MNC is using geographic diversification as a natural hedge, and thus the more the company will use FXDs, *ceteris paribus*. As summarised in the prior section, only a handful of studies have acknowledged such alternative risk management techniques, and none have incorporated a measure of geographic diversification natural hedges. In addition to testing these hypotheses, we consider both the industry effects and the economies of scale in using FXDs discussed in prior studies.

### 3.2. Sample selection

The population consists of all US MNCs on the *Standard and Poor's* Compustat PC Plus database with ex ante foreign currency exposure, operating in the non-oil manufacturing industries. Like Geczy et al. (1997), we sample industrial companies that are more likely to face currency risk in order to improve the internal validity of our analysis. In particular, we select all companies having foreign sales equal to 20% or more of their total sales in 1994 and 1995 (see Donnelly and Sheehy, 1996) that operated in the non-oil manufacturing industries. Manufacturing companies were selected, as such MNCs are major users of FXDs (see for example, Bodnar et al., 1996). Following previous research (see for example, Jorion, 1990), companies operating in the petroleum or coal products industries were omitted, as these MNCs exposure to changing exchange rates is fundamentally different from other industries in our sample.

Using this selection procedure, the final sample consists of 309 annual observations over the 1994–1995 sample period.[7] Table 1 details the sample distribution by industry membership and illustrates the wide range of manufacturing industries represented. Three-digit SIC codes are detailed in Table 1 when they represent 10 or more sample observations. The *Standard and Poor's* Compustat PC Plus database was used to obtain industry membership information as well as all other data needed for subsequent analyses except the FXD information. Data on FXD use were gathered by hand from annual reports provided directly to us by sample companies.

### 3.3. Research models

The two hypotheses are tested using ordinary least squares (OLS) regression estimates of the following model:

$$\ln(FXDA_{it}) = \alpha + \beta_1 \ln(FSA_{it}) + \beta_2 \ln(HHIS_{it}) + \beta_3 \ln(MVE_{it}) + \varepsilon_{it} \qquad (1)$$

where

$FXDA_{it}$ = the notional amount of foreign exchange derivatives (per annual report

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[6] Companies' hedging strategies also have been attributed to taxes, bankruptcy and financing costs (see for example, Froot et al., 1993). In addition to the geographic diversification associated with multiple foreign operations, other natural hedge techniques include funding foreign operations with foreign borrowings, and diversifying import and/or export markets to countries whose currencies do not closely track each other (Bruinstroop and Godfrey, 1992; Arterian, 1993; Brealey and Kaplanis, 1995; Logue, 1995; Godfrey and Yee, 1996; Gezcy et al., 1997).

[7] The final sample of 309 annual observations represents 174 companies for the 1994–1995 period. Sample observations exclude companies lacking information needed for subsequent analyses in any one year. As discussed in footnote 10, the sample also excludes six companies identified as outliers.

**Table 1**
**Sample distribution by industry membership**

| *SIC Code and industry description* | | *Number of observations* | *SIC Code and industry description* | | *Number of observations* |
|---|---|---|---|---|---|
| 20XX | Food and kindred products | 14 | 353X | Construction and related machinery | 3 |
| 22XX | Textile mill products | 5 | 354X | Metalworking machinery | 5 |
| 25XX | Furniture and fixtures | 3 | 355X | Special industry machinery | 2 |
| 26XX | Paper and allied products | 10 | 356X | General industrial machinery | 9 |
| 27XX | Printers and publishers | 5 | 357X | Computer and office equipment | 36 |
| 281X | Industrial inorganic chemicals | 10 | 364X | Electrical lighting and wiring equipment | 5 |
| 282X | Plastic materials and synthetics | 8 | 365X | Household audio and video equipment | 3 |
| 283X | Drugs | 24 | 366X | Communications equipment | 6 |
| 284X | Soap, cleaners and toilet goods | 3 | 367X | Electronic component accessories | 15 |
| 286X | Industrial organic chemicals | 9 | 369X | Misc. electrical equipment and supplies | 3 |
| 289X | Misc. chemical products | 12 | 37XX | Transportation equipment | 15 |
| 30XX | Rubber and plastic products | 17 | 382X | Measuring and control devices | 20 |
| 31XX | Leather and leather products | 4 | 384X | Medical instruments and supplies | 14 |
| 33XX | Primary metal industries | 12 | 385X | Ophthalmic goods | 2 |
| 34XX | Fabricated metal products | 13 | 386X | Photographic equipment and supplies | 5 |
| 351X | Engines and turbines | 6 | 39XX | Misc. manufacturing industries | 9 |
| 352X | Farm and garden machinery | 2 | | Total sample | 309 |

disclosures) scaled by consolidated assets for company *i* in year *t*;

$FSA_{it}$ = foreign sales (per annual report disclosures) scaled by consolidated assets for company *i* in year *t*;

$HHIS_{it}$ = the sales-based Herfindahl index calculated as the sum of the squares of each foreign geographic segment's sales scaled by consolidated sales squared (using annual report disclosures) for company *i* and *t*; and

$MVE_{it}$ = the market value of equity for company *i* in year *t* (per annual report disclosures).

It is expected that the dependent variable will be positively associated with each of the first two independent variables (FSA and HHIS), while the predicted sign pertaining to the size proxy for scale economies (MVE) is indeterminate.

A natural log transformation is used to correct for non-constant variance in the OLS residuals (see Dielman, 1991). After this transformation, there is no evidence of heteroscedasticity using White's test (White, 1980). An additional advantage of the log transformation is that the slope coefficients measure the elasticity of the dependent variable with respect to each independent variable (see Neter, Wasserman and Kutner, 1990).

The dependent variable (FXDA) represents US MNCs' use of FXDs. Notional principal amounts capture the MNCs' extent of involvement in FXDs (per Financial Accounting Standards Board, 1990, para. 89) and are scaled by consolidated assets.[8] Following prior studies, the first independent variable (FSA) represents the company's exposure to changing exchange rates (see for example, Jorion, 1990) and is scaled by consolidated assets. A statistically significant and positive coefficient on this variable is consistent with the first hypothesis.

The second independent variable (HHIS) represents the company's degree of geographic concentration using a foreign sales concentration measure based on the Herfindahl index.[9] The

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[8] While notional amounts measure a company's extent of involvement in FXDs and other off-balance-sheet financial instruments, prior studies provide evidence that such amounts also provide risk relevant information (see for example, McAnnally, 1996).

[9] In contrast to the first independent variable (FSA), which measures the relative level of foreign sales, the HHIS variable considers the geographic distribution of such sales. See Section

**Table 2**
**Descriptive statistics and tests of hypotheses**

| **Panel A: Descriptive statistics** | *Mean* | *Median* | *Std. Dev.* |
|---|---|---|---|
| Notional amount of FXD | 900.8 | 135.0 | 3,170.5 |
| Foreign Sales | 2,587.7 | 785.2 | 5,649.3 |
| Market value of equity (MVE) | 6,740.7 | 1,841.5 | 13,153.8 |
| Consolidated assets | 8.097.8 | 1,925.9 | 28,235.8 |
| Consolidated sales | 6,623.7 | 2,213.4 | 17,549.1 |
| FXDA | 0.097 | 0.062 | 0.116 |
| FSA | 0.459 | 0.437 | 0.203 |
| HHIS | 0.105 | 0.086 | 0.087 |

| **Panel B: Tests of hypotheses** | *Estimate* | *t-value* |
|---|---|---|
| Constant | −3.752 | −11.140[a] |
| FSA ($\beta_1$) | 0.261 | 1.621[b] |
| HHIS ($\beta_2$) | 0.186 | 1.833[b] |
| MVE ($\beta_3$) | 0.209 | 5.840[a] |
| Adjusted $R^2$ (n = 309) | 0.129 | |

Descriptive statistics are computed for the 309 sample observations in millions of dollars, using amounts per corporate annual reports.

Hypotheses are tested using pooled estimates of the model expressed in equation (1), which is significant at the 0.0001 level (*F*-value = 16.166).

$$\ln(FXDA_{it}) = \alpha + \beta_1 \ln(FSA_{it}) + \beta_2 \ln(HHIS_{it}) + \beta_3 \ln(MVE_{it}) + \varepsilon_{it}$$

FXDA = (notional amount of foreign exchange derivatives)/(consolidated assets);
FSA = (foreign sales)/(consolidated assets);
HHIS = sum of (each foreign segment's sales squared)/(consolidated sales squared);
MVE = (year-end closing price of common stock) X (number of shares outstanding).

[a]significant at the one-sided 0.01 level.
[b]significant at the one-sided 0.05 level.

higher the index, the more geographically concentrated the company. Thus, a statistically significant and positive coefficient on the second variable is consistent with the second hypothesis. The third independent variable (MVE) proxies information and transaction cost scale economies in FXD use. While construct validity concerns hinder prediction of the relationship to the dependent variable, a statistically significant and positive coefficient on the MVE variable is consistent with scale economies in FXD use.

Previous studies (see for example, Belk and Glaum, 1990) caution that MNCs' currency risk management practices may be affected by whether and how a company's competitors hedge their exposure to changing exchange rates. To assess the sensitivity of the primary results to industry effects, equation (1) is expanded to include a series of dummy variables representing the two-digit SIC codes for sample industries. One two-digit SIC code (39XX) is excluded to avoid perfect multicollinearity among the dummy variables (see Pindyck and Rubinfeld, 1991). Specifically, industry effects were examined using OLS regression estimates of the following model:

$$\ln(FXDA_{it}) = \alpha + \beta_1 \ln(FSA_{it}) + \beta_2 \ln(HHIS_{it}) + \beta_3 \ln(MVE_{it}) + \beta_4 SIC2_{1it} + \ldots + \beta_{17} SIC2_{14it} + \varepsilon_{it} \quad (2)$$

where $SIC2_{jit}$ is coded as 1 for company *i* operating in industry group *j* during year *t* (*j* = 1–14, as defined by the two-digit SIC code), and as 0 otherwise. To the extent that the coefficients on the variables of interest (FSA, HHIS, MVE) remain positive and statistically significant, the primary analysis is robust to industry effects.

## 4. Results

### 4.1. Primary analysis

Panel A of Table 2 presents the descriptive statistics pertaining to the model variables as well as

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4.2. below for robustness checks using foreign assets in place of foreign sales.

the corresponding amounts from the corporate annual report, including the market value of equity which proxies scale economies in equations (1) and (2). Together, these statistics highlight that the mean level of FXD use is $900.8m, or 9.7% of consolidated assets. The mean level of foreign sales for the sample MNCs is $2,587.7m, representing nearly one-half of consolidated assets (mean FSA amount of 0.459). The reported amounts for the market value of equity indicate that the sample companies are large, with a mean value of $6,740.7m., though fairly diverse in size (standard deviation of $13,153.8m.). Similarly, the standard deviation pertaining to the HHIS variable is relatively large compared to its mean value of 0.105, indicating variability in the sample companies' geographic concentration.

Hypotheses are tested using pooled estimates of the OLS regression model expressed in equation (1). The results are summarised in Panel B of Table 2. The regression model is statistically significant at the 0.0001 level (*F*–value = 16.166).[10] Likewise, all three estimated coefficients are significant (at the one-sided 0.05 level) and positive, as expected. Consistent with alternative hypothesis one, the estimated coefficient on the FSA variable indicates that there is a significant and positive relationship between the use of FXDs and the level of foreign exchange exposure, for a given degree of geographic concentration and company size. Likewise, the estimated coefficient on the HHIS variable supports the expected relationship between FXD use and geographic concentration. Specifically, a 1% increase in concentration, which is indicative of the company using less natural hedging, is associated with a 0.186% increase in FXD use.[11] Finally, the estimated coefficient on the MVE variable is consistent with scale economies in FXD use.

### *4.2. Robustness*

Table 3 details the OLS regression results pertaining to the industry sensitivity analysis using equation (2). The model is statistically significant at the 0.0001 level (*F*–value = 3.909). The estimated coefficients on all three variables of interest (FSA, HHIS and MVE) remain positive and statistically significant, indicating that the primary analysis presented in Panel B of Table 2 is robust to industry effects. Moreover, a partial F-test indicates that the full model depicted in equation (2) is not significantly better (*F*–value = 1.160, insignificant at the 0.10 level) than the reduced model depicted in equation (1) in explaining variations in FXD use (see Dielman, 1991).

We conjecture that the absence of industry effects may be due to the difficulty in operationalising the risk management strategies of competitors. Specifically, the two-digit SIC code variables in equation (2) may be too coarse to capture industry effects. Accordingly, a three-digit SIC code approach to equation (2) was used for those industries with sufficient observations, in place of the two-digit independent variables. The results are qualitatively similar to those presented in Table 3. Likewise, the primary results are robust to excluding the three-digit SIC code with the largest number of observations (357X).

As an additional check for robustness, an asset-based measure for geographic diversification was used in place of the sales-based independent variable in equation (1). Panel A of Table 4 contrasts the descriptive statistics for the sales-based measure used in our prior analyses (HHIS) with those of the asset-based measure (HHIA). In relation to its mean value of 0.095, the HHIA measure is positively skewed (median of 0.065) and has greater variability (standard deviation of 0.098) than the HHIS measure. Given such HHIA data distribution, Panel B and Panel C re-examine the tests of hypotheses using the full sample and the subsample of observations within one standard deviation of the mean HHIA value, respectively.

Panel B of Table 4 details the OLS regression results for the full sample estimates of the modified equation (1). As in Table 2 and Table 3, the model remains statistically significant at the 0.0001 level (*F*–value = 15.075), and the estimated coefficients are all positive. The coefficients on HHIA, however, is not statistically significant (at the one-sided 0.05 level). In contrast, the subsample results summarised in Panel C indicate that all three coefficients are significant and positive, and thus support both hypotheses as well as the scale economies in FXD use. Together with the evidence presented in Table 3, these results indicate that our

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[10] With regard to model assessment issues, diagnostics used to assess OLS error-term assumptions include residual and normal probability plots, the Shapiro-Wilk test for non-normality, the Durbin-Watson test for autocorrelation, and the White test for heteroscedasticity. The Prais-Winsten procedure was used to evaluate the sensitivity of results to first order autocorrelation. Variance inflation factors were utilised in assessing linear independence among the explanatory variables, and diagnostics from the INFLUENCE option (the SAS regression procedure) were used to evaluate the presence of outliers. Referring to these latter diagnostics, six companies were identified as outliers with fundamentally different economic conditions and thus were omitted from the 309 sample observations. In total, the model diagnostics suggest that departures from OLS assumptions do not hinder tests of hypotheses.

[11] We also employed an expanded version of equation (1) to consider whether the relationship between the dependent variable (FXDA) and the foreign currency exposure variable (FSA) is affected by geographic concentration (HHIS). The coefficient on this cross-product term is not statistically significant (at a 0.10 level), indicating that the relationship between FXD and FSA is independent of HHIS (see Neter et al., 1990). Similarly, expanding equation (1) for a time effect dummy variable (equal to 1 in 1995, and 0 otherwise) does not contribute to explaining variations in FXD use (see Berry and Lewis-Beck, 1986).

**Table 3**
**Sensitivity tests pertaining to industry membership**

| | *SIC Code* | *Estimate* | *t-value* |
|---|---|---|---|
| Constant | | −4.122 | −9.081[a] |
| FSA ($\beta_1$) | | 0.234 | 1.348[c] |
| HHIS ($\beta_2$) | | 0.214 | 1.960[b] |
| MVE ($\beta_3$) | | 0.254 | 6.273[a] |
| $\beta_4$ | 20XX | −0.187 | −0.427 |
| $\beta_5$ | 22XX | 1.400 | 2.527[a] |
| $\beta_6$ | 25XX | −0.180 | −0.267 |
| $\beta_7$ | 26XX | 0.086 | 0.186 |
| $\beta_8$ | 27XX | 0.239 | 0.431 |
| $\beta_9$ | 28XX | −0.019 | −0.054 |
| $\beta_{10}$ | 30XX | −0.025 | −0.060 |
| $\beta_{11}$ | 31XX | 0.821 | 1.352[c] |
| $\beta_{12}$ | 33XX | 0.500 | 1.111 |
| $\beta_{13}$ | 34XX | −0.123 | −0.282 |
| $\beta_{14}$ | 35XX | 0.199 | 0.558 |
| $\beta_{15}$ | 36XX | −0.079 | −0.208 |
| $\beta_{16}$ | 37XX | −0.190 | −0.444 |
| $\beta_{17}$ | 38XX | 0.123 | 0.335 |
| Adjusted $R^2$ ($n=309$) | | 0.138 | |

Industry sensitivity analysis pertains to equation (2) which is significant at the 0.001 level (*F*-value = 3.909).

$$\ln(FXDA_{it}) = \alpha + \beta_1 \ln(FSA_{it}) + \beta_2 \ln(HHIS_{it}) + \beta_3 \ln(MVE_{it}) + \beta_4 SIC2_{1it} + \ldots + \beta_{17} SIC2_{14it} + \varepsilon_{it}$$

where $SIC2_{jit}$ is coded as 1 for company *i* operating in industry group *j* during year *t* ($j = 1\text{-}14$).

[a]significant at the one-sided 0.01 level.
[b]significant at the one-sided 0.05 level.
[c]significant at the one-sided 0.10 level.

primary analysis is robust to alternative specifications and procedures.[12]

## 5. Summary and conclusions

This study investigates large US MNCs' use of FXDs in relation to their exposure to changing foreign currency exchange rates and their use of geographic diversification as a natural hedge. We hypothesise that sample companies' FXD use will increase with such currency risk, as well as with the geographic concentration indicative of the companies using less natural hedging. Moreover, we examine whether their use of FXDs is influenced by industry membership. Evidence regarding the information and transaction cost scale economies in FXD use is also provided. Empirically, little is known about large US MNCs' FXD use or how natural hedging affects such risk management practices.

The results support our hypotheses, indicating that FXD use is associated with foreign currency exposure and the use of geographic diversification natural hedges. The primary analysis also provides evidence consistent with economies of scale in FXD use. Finally, the sensitivity analysis suggests that the primary results are robust to industry membership as well as to the specification of geographic diversification.

While the results are strong, they apply only to companies in our sample of large US MNCs operating in the non-petroleum manufacturing industries. The size and industry restrictions are designed to capture major users of FXDs and to control for extraneous variables. Whether our results are generalisable to other companies is left to future studies. Likewise, future research could address the construct validity concerns regarding the

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[12] In addition to the robustness checks provided in Table 3, Table 4 and footnote 11, the sensitivity of our primary results to FXD types and alternative currency risk measures was examined. In our sample, there are 48 observations that pertain to companies using currency swaps alone or in conjunction with other FXDs, such as forward contracts and options. The OLS regression results for the original equation (1) excluding such swap observations are qualitatively similar to those presented in Table 2. Likewise, using foreign assets in place of foreign sales to measure currency risk provides full sample results qualitatively similar to Table 2.

**Table 4**
**Additional analyses pertaining to geographic diversification**

| **Panel A: Descriptive stastistics** | *Mean* | *Median* | *Std. Dev.* |
|---|---|---|---|
| HHIS | 0.105 | 0.086 | 0.087 |
| HHIA | 0.095 | 0.065 | 0.098 |

| **Panel B: Full sample tests of hypotheses** | *Estimate* | *t-value* |
|---|---|---|
| Constant | −3.957 | −12.275$^a$ |
| FSA ($\beta_1$) | 0.393 | 2.659$^a$ |
| HHIA ($\beta_2$) | 0.054 | 0.710 |
| MVE ($\beta_3$) | 0.209 | 5.811$^a$ |
| Adjusted $R^2$ (n = 309) | 0.121 | |

| **Panel C: Subsample tests of hypotheses** | *Estimate* | *t-value* |
|---|---|---|
| Constant | −3.441 | −9.050$^a$ |
| FSA ($\beta_1$) | 0.381 | 2.468$^a$ |
| HHIA ($\beta^2$) | 0.171 | 1.853$^b$ |
| MVE ($\beta_3$) | 0.190 | 5.056$^a$ |
| Adjusted $R^2$ (n = 278) | 0.136 | |

Descriptive statistics are computed for the 309 sample observations in millions of dollars.

Tests of hypotheses use pooled estimates of modified equation (1), which is significant at the 0.0001 level in Panels B & C. Panel B uses the full sample (*F*-value = 15.075), while Panel C excluded 31 observations with HHIA values greater than one standard deviation from the mean HHIA value (*F*-value = 15.515).

$$\ln(FXDA_{it}) = \alpha+\beta_1\ln(FSA_{it})+\beta_2\ln(HHIA_{it})+\beta_3\ln(MVE_{it})+\varepsilon_{it}$$

FXDA = (notional amount of foreign exchange derivatives)/(consolidated assets);
FSA = (foreign sales)/(consolidated assets);
HHIA = sum of (each foreign segment's assets squared)/(consolidated assets squared);
MVE = (year-end closing price of common stock) X (number of shares outstanding).

[a] significant at the one-sided 0.01 level.
[b] significant at the one-sided 0.05 level.

use of company size to proxy scale economies. Furthermore, research on natural hedge techniques other than geographic diversification is warranted, given the continued globalisation of the business environment and the accompanying exposure to changing exchange rates.

## References

Arterian, S. (1993). 'Smooth sailing through currency swings'. *CFO*, 9 (January): 53–55.

Ball, R. and Foster, G. (1982). 'Corporate financial reporting: a methodological review of empirical research'. *Journal of Accounting Research*, 20 (Supplement): 161–234.

Belk, P. and Glaum, M. (1990). 'The management of foreign exchange risk in UK multinationals: an empirical investigation'. *Accounting and Business Research*, 21 (Winter): 3–13.

Beresford, D. R. and Johnson, L. T. (1995). 'Interactions between the FASB and the academic community'. *Accounting Horizons*, 9 (December): 108–117.

Berkman, H. and Bradbury, M. E. (1996). 'Empirical evidence on the corporate use of derivatives'. *Financial Management*, 25 (Summer): 5–13.

Berry, W. and Lewis-Beck, M. (1986). *New Tools for Social Scientists*. Beverly Hills, California: Sage.

Bodnar, G. M., Hayt, G. S. and Marston, R. C. (1996). '1995 Wharton survey of derivative usage by US non-financial firms'. *Financial Management*, 25 (Winter): 113–133.

Bodnar, G. M., Hayt, G. S., Marston, R. C. and Smithson, C. W. (1995). 'Wharton survey of derivative usage by US non-financial firms'. *Financial Management*, 24 (Summer): 104–114.

Booth, J. R., Smith, R. L. and Stolz, R. W. (1984). 'The use of interest futures by financial institutions'. *Journal of Bank Research*, 15 (Autumn): 15–20.

Brealey, R. A. and Kaplanis, E. C. (1995). 'Discrete exchange rate hedging strategies'. *Journal of Banking and Finance*, 19 (August): 765–784.

Broll, U. (1992). 'The effect of forward markets on multinational firms'. *Bulletin of Economic Research*, 44 (July): 233–240.

Bruinstroop, P. and Godfrey, J. M. (1992). 'Foreign currency accounting regulation in Australia: Responses of the resource sector'. *Accounting and Business Research*, 22 (Summer): 195–205.

Cheney, G. (1997). 'Levitt defends FASB in derivatives battle'. *Accounting Today*, 11 (July 7): 1.

Collier, P., Davis, E. W., Coates, J. and Longden S. (1990). 'The management of currency risk: Case studies of US and UK multinationals'. *Accounting and Business Research*, 79 (Summer): 206–210.

Collier, P. and Davis, E. W. (1985). 'The management of currency risk by UK multinational companies'. *Accounting and Business Research*, 44 (July): 233–240.

Dielman, T. E. (1991). *Applied Regression Analysis for Business and Economics*. Boston, Massachusetts: PWS.

Donnelly, R. and Sheehy, E. (1996). 'The share price reaction of UK exporters to exchange rate movements: an empirical study'. *Journal of International Business Studies*, 27 (First Quarter): 157–165.

Financial Accounting Standards Board (1998). *Accounting for Derivative Instruments and Hedging Activities*, Norwalk, Connecticut: Author.

Financial Accounting Standards Board (1994). *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments*. Norwalk, Connecticut: Author.

Financial Accounting Standards Board (1991). *Disclosures about Fair Value of Financial Instruments*. Norwalk, Connecticut: Author.

Financial Accounting Standards Board (1990). *Disclosure of Information about Financial Instruments with Off-balance-sheet Risk and Financial Instruments with Concentrations of Credit Risk*. Norwalk, Connecticut: Author.

Froot, K. A., Scharfstein, D. S. and Stein, J. C. (1993). 'Risk management: coordinating corporate investment and financing policies'. *Journal of Finance*, 48 (December): 1,629–1,658.

Geczy, C., Minton, B. A. and Schrand, C. (1997). 'Why firms use currency derivatives'. *Journal of Finance*, 52 (September): 1,323–1,354.

Godfrey, J. M. and Yee, B. (1996). 'Mining sector currency risk management strategies: Responses to foreign currency accounting regulation'. *Accounting and Business Research*, 26 (Summer): 200–214.

Greenspan, A. (1997). *Letter to Mr. Edmund L. Jenkins, Chairman of Financial Accounting Standards Board*, Washington, D.C.: Board of Governors of the Federal Reserve System.

Houston, C. O. and Mueller, G. G. (1988). 'Foreign exchange rate hedging and SFAS No. 52: relatives or strangers?' *Accounting Horizons*, 2 (December): 50–57.

Jorion, P. (1990). 'The exchange-rate exposure of US multinationals'. *Journal of Business*, 63 (July): 331–345.

Kerlinger, F. N. (1986). *Foundations of Behavioral Research*, Fort Worth, Texas: Holt, Rinehart and Winston.

Linsmeier, T. J., Gribble, J., Jennings, R. G., Lang, M. H., Penman, S. H., Petroni, K. R., Shores, D., Smith, J. H. and Warfield, T. D. (1997). 'Response to FASB Exposure Draft Proposed Statement of Financial Accounting Standards: accounting for Derivatives and Similar Financial Instruments and Hedging Activities'. *Accounting Horizons*, 11 (March): 157–163.

Logue, D. (1995). 'When theory fails: globalization as a response to the (hostile) market for foreign exchange'. *Journal of Applied Corporate Finance*, 8 (Fall): 39–48.

Mathur, I. (1982). 'Managing foreign exchange risk profitably'. *Columbia Journal of World Business*, 17 (Winter): 23–30.

McAnally, M. L. (1996). 'Banks, risk and FAS 105 disclosures'. *Journal of Accounting, Auditing and Finance*, 11 (Summer): 453–490.

Mian, S. L. (1996). 'Evidence on corporate hedging policy'. *Journal of Financial and Quantitative Analysis*, 31 (September): 419–439.

Nance, D. R., Smith, C. W. and Smithson, C. W. (1993). 'On the determinants of corporate hedging'. *Journal of Finance*, 48 (March): 267–284.

Neter, J., Wasserman, W. and Kutner, M. (1990). *Applied Linear Statistical Models*. Boston, Massachusetts: Irwin.

Phillips, A. L. (1995). '1995 derivative practices and instrument survey'. *Financial Management*, 24 (Summer): 115–125.

Pindyck, R. S. and Rubinfeld, D. L. (1991). *Econometric Models and Economic Forecasts*. New York, New York: McGraw-Hill.

Rodriguez, R. (1981). 'Corporate exchange risk management: themes and aberrations'. *Journal of Finance*, 36 (May): 427–442.

United States Securities and Exchange Commission (1997). *Disclosure of Accounting Policies for Derivative Financial Instruments and Derivative Commodity Instruments and Disclosure of Quantitative and Qualitative Information about Market Risk Inherent in Derivative Financial Instruments, other Financial Instruments, and Derivative Commodity Instruments*. Washington, D.C.: Author.

White, H. (1980). 'A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity'. *Econometrica*, 48 (May): 817–838.

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# A benchmark for the adequacy of published financial statements

**David Alexander***

**Abstract**—This paper considers the problem of establishing a criterion against which auditors and others can judge the adequacy of financial reporting. Three types of criteria are considered: a general over-riding requirement (type A), an integrated coherent framework (type B), and detailed regulation (type C). Approaches, trends and arguments are presented from a number of contexts, such as UK, US and Europe. Where more than one type of criterion is present (all three exist in the UK for example) one must be superior to the others. There can only be one *deciding* benchmark of adequacy. It is argued that type B is inadequate as such a benchmark, as all attempted 'conceptual' frameworks are internally inconsistent. Types A and C are both theoretically possible, but it is argued that only Type A is consistent, as *the* ultimate benchmark of adequacy, with the provision of useful information in a dynamic economic world. The current IASC thinking as demonstrated in IAS1 (revised) (IASC 1977a) is discussed, and contrasted with the fundamentally different proposals in the earlier exposure draft E53 (IASC 1996). The arguments of the paper throw considerable light on this debate, and are consistent with the final content of IAS1 (revised).

## 1. Introduction and scope

Accounting standards are a hot topic in both professional and academic circles. In the UK, the progress of the Accounting Standards Board (ASB), since its creation in 1990, as it seeks to establish its position vis-a-vis preparers on the one hand and the law on the other, is proving a fascinating saga. Further afield, developments in the US, IASC and Europe, and the inter-relationships and tensions between them, are likewise complicated, interesting and ongoing.

On a more formal basis, various attempts have been made to analyse the role of standard-setters, and to suggest approaches which would theoretically optimise their activities. A seminal example is the work of James Gaa (e.g., Gaa 1986). The thrust of Gaa's paper is most fairly given by direct quotation.

> Two basically different kinds of distributional principles governing a standard-setter's decision have been advanced in the accounting literature. According to one, all affected parties are to be treated equally by the standard-setter,....According to the other kind of principle, some subset of the population affected by financial accounting and reporting standards would be given preferential treatment......This paper is a critical examination of the theoretical foundations of one principle of the latter type, the user primacy principle. (Gaa, 1986: 436).

Gaa's work has been favourably referenced by a number of later writers. See for example Mumford (1994). It is clear from the extracts quoted that Gaa's paper, notwithstanding its (genuine) claim to explore theoretical foundations, is four-square *about* accounting standards. The existence, and indeed the supremacy, of accounting standards in determining the content of financial statements is taken as a sine qua non. The question, in effect, which Gaa seeks to address is: what would make, and how can we go about establishing what would make, adequate accounting *standards*?

The present paper, by contrast, addresses a different, and logically prior, question. Our question, in its simplest form, is: what would make, and how can we go about establishing what would make, adequate financial *statements*? In the UK and US (and IASC) contexts, this question would be considered given the existence of a body of financial reporting standards. In some other jurisdictions there currently exists no such body (e.g. Germany). Where a body of standards does exist, it is possible that it is effectively the *only* determinant of the content of financial statements (whether the US is an example of this is considered below). However, it is also of course possible, as in the

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*The author is Director of Research, Centre for International Accounting Research, School of Accounting, Business and Finance, University of Hull, Hull HU6 7RX. Tel. (44) 01482 465719, Fax (44) 01482 466377. The ideas in this paper have evolved over a number of years, and some parts have appeared in draft in various conference papers. The author is grateful to all those who have helped, directly or indirectly, in the paper's development. In particular, two reviewers and the editor have given time and critical involvement unstintingly. This paper was accepted in May 1999, and remains, to quote one of the reviewers, 'tendentious', and reactions are welcome.

UK and as with the IASC following IAS1 (revised) (IASC 1997a), that it is not the unique determinant.

There is therefore a need, in the general case, to take a much broader view than Gaa and his followers have done. This paper seeks to explore the type of criteria, of which a body of accounting standards is but one of a range of distinct possibilities, which can be used to determine the content of, and as a yardstick to assess the adequacy of, published financial statements. The arguments are built up from first principles, and are then related to thought and practice in a number of jurisdictions. Agreement on the criteria for adequacy, and even more fundamentally on the type of criteria to be sought in order to establish adequacy, is an essential pre-requisite for appraising the validity of attempts to satisfy the reporting function.

Looking across recent developments internationally we can discern three broadly defined approaches to the problem of stating a benchmark or criterion against which the adequacy of any particular financial reporting environment, or any specific set of financial statements, can be determined.

These three broadly defined approaches may be characterised as follows:

Type A. A generally expressed all-pervasive fundamental concept.

Type B. A set of rules, conventions or ways of thinking which are to be consistently applied to situations both familiar and unfamiliar.

Type C. The detailed provision of specific methods for the treatment of all expected problems and situations.

The essential argument of this paper is that:

i) Type B criteria are not operationally effective, at least in practice as so far created.

ii) Type C criteria will normally provide a convenient day-to-day checklist for defining the adequacy of financial statements, but they must be consistent with, and therefore ultimately subservient to, Type A criteria. The higher level criteria provide a rationale for debating and preferring alternative Type C rules but do not uniquely determine them.

The remainder of this paper is structured as follows: Section 2 discusses and illustrates key features of the three approaches as defined above. Sections 3, 4, 5, 6 and 7 discuss recent developments relating to the theme of the paper in the UK, European, Australian, US and IAS jurisdictions. Section 8 attempts a summation and conclusion.

## 2. Three approaches to defining adequacy

The archetypal accounting example of Type A is undoubtedly the 'true and fair view' concept. Substance over form could well be another illustration. In British eyes this is often seen as an offshoot of true and fair view (TFV), but it need not necessarily be so: 'to properly represent the economic substance of transactions and situations' could stand alone as an all-pervasive fundamental concept. Other jurisdictions suggest very different examples. Prudence, or the maintenance of economic stability, might be possible German claimants. See Kuhner (1997) and the reply by Alexander (1997).

The Type B approach is illustrated by documents such as the IASC Framework for the Preparation and Presentation of Financial Statements (IASC 1989), and the largely similar documents emerging in the UK from the Accounting Standards Board (ASB, 1995a, 1999), in Australia from the AASB (Statements of Accounting Concepts, various dates), and elsewhere. These documents grew indirectly from the earlier 'Conceptual Framework' project undertaken in the US from the middle 1970s. By its title, a 'conceptual framework' appears intended to provide a coherent structure of ideas, on which or within which detailed applications can be constituted or derived which are themselves logically consistent both with each other and with the underlying framework.

It is not obvious that any of the various frameworks and statements of principles which have appeared justify the 'conceptual framework' description often loosely given to them. In each case it is easy to show (as illustrated in general terms later in the paper) that these frameworks are not coherent structures in an internal consistency sense. Two possible conclusions could be drawn from this. The first possibility is that all the existing sets of Type B criteria are incoherent in that sense, as a function of their own particular content and preparation. The second possibility is that all possible sets of Type B criteria will *necessarily* be so incoherent. The latter proposition is not susceptible to formal proof in a scientific sense—we are dealing with social constructs here. But given the multitude of user groups and user needs and the multitude of institutional, infrastructural (and simply human) influences, we can reasonably postulate the implausibility of any set of Type B criteria being coherent in an internal consistency sense. It should be noted that this conclusion does not imply that such frameworks are valueless, merely that they cannot be used by themselves to provide the ultimate criterion of adequacy.

The third approach, Type C, is perhaps classically illustrated by the practice in a number of jurisdictions of the use of tax-allowed write-offs, derived directly from tax law, in published financial statements. More generally, it relates to any situation where complete rules and regulations are attempted, and it is not restricted to situations where the rules and regulations are created directly by the State.

These three-way distinctions can be criticised. The barriers are not necessarily watertight. For example, substance over form and prudence, already suggested as possible Type A criteria, are both included in the IASC and ASB Type B Framework/ Statement of Principles. Perhaps more fundamentally, the three types could be said to be incommensurable in that Type A addresses the problem at a holistic level whereas Type C operates at the level of detail. Type B lies somewhere in the middle and purports to provide some general but operational concepts, theoretically consistent with any chosen Type A criterion, to assist in the development of the Type C detail.

In terms of their practical existence as relevant forces therefore, these three broadly defined approaches are not mutually exclusive, and many jurisdictions contain at least two of them. Where two or three different levels of approach are present in a jurisdiction (i.e. two or all of types A, B and C as described above), there is clearly the possibility of conflict between them.

How could or should such conflict be resolved? The general point is that if we have, for example, a number of possible alternative rules to consider, including all three types A, B and C, then we need to clarify which Type has precedence before we can decide on the operational rule. Thus we might have six possible rules available:

(i) do not mislead shareholders (Type A)
(ii) follow the matching convention (Type B)
(iii) follow the prudence convention (Type B)
(iv) write off all applied research expenditure (Type C)
(v) capitalise applied research expenditure and amortise over expected useful life (which could be nil) (Type C)
(vi) capitalise applied research expenditure and amortise equally over three years (Type C).

Rules (iv), (v) and (vi), considered alone as a trio, represent an arbitrary choice. Reference to more general Type B criteria may provide a rationale for choice, removing the arbitrariness. But in this case it doesn't, because the two Type B 'rules' suggest different preferences amongst the Type C alternatives. In order to avoid an arbitrary choice between the two Type B rules, reference must be made to the still more general Type A 'rule' to provide a rationale for preference at the Type B level and therefore at the Type C level.

This is not to say that such 'upward' reference removes debate or uncertainty about the actual Type C rule to follow. But it is to say that the upward reference allows for, indeed stimulates and engenders, rational consideration rather than arbitrary choice.

It is instructive to observe that the argument would not work in reverse. Suppose we add to the above situation a seventh rule, i.e. (vii) maintain economic stability (Type A). We are not helped in choosing between (i) and (vii) as the preferable Type A approach by considering the three Type C alternatives. (Looking at the preferred Type C rule in a jurisdiction may tell us which Type A rule was preferred when the Type C rule achieved preference in that jurisdiction, but that is not the issue.)

## 3. A criterion for adequacy—recent UK developments

The UK contains all three types of approach. As Type A it has the all-pervasive, and over-riding, true and fair view. As Type B it has a set of important concepts and conventions, such as the four 'fundamental concepts' of SSAP2, all of which are included in the five 'accounting principles' of Schedule 4, Companies Act 1985. And as Type C it has a certain amount of detailed regulation in the Companies Act 1985 as amended and considerably more in the Accounting Standards, statements from the Urgent Issues Task Force under the auspices of the ASB, and so on.

In the UK, TFV is generally agreed to be the over-riding requirement. UK law is explicit on the point and has been since 1947, and the idea seems to be universally supported and universally practised in the UK. Of equal importance, in the author's view, the *idea*, though not the precise wording of statute, predates 1947 by many decades. In the absence of detailed law, custom prevails, and if detailed law fails to give an adequate overall picture (whatever that may mean, of course) then the detailed law must be ignored or, if necessary, overridden. What the 'adequate overall picture' does mean is itself a matter of custom and consensus agreement.

The strength of this philosophy, of which the 1947 TFV wording was merely a formal, statutory recognition, is well illustrated in the 'Royal Mail Steam Packet Company' case (Hastings 1962). The published accounts for 1926 showed a profit of £439,000. The internal accounts for the year showed a loss of some £300,000, and the difference was achieved by crediting the profit and loss balance with £750,000 out of secret tax reserves (published accounts at this time did not prescribe a profit and loss account). The only indication of this highly significant adjustment was the statement, inserted by the auditor, that the profit figure was 'including adjustment of taxation reserves'. The auditor (and the chairman) were accused of producing a fraudulent balance sheet.

The auditor's line of defence was simple: 'The defence must necessarily turn upon the one question, whether or not the words used by (the auditor) were well recognised in accountancy circles, and were sufficient to give notice of the manner in which the trading loss had been turned into an apparent profit. Whether or not this accountancy practice was to be commended was, in our view, wholly immaterial. The charge we had to meet was a charge of dishonesty, and if it could be shown that (the auditor) had merely adopted the customary practice, it would be very difficult to accuse him of dishonesty' (Hastings 1962).

Expert accounting witnesses testified that, at the time, such wording was customary practice. The auditor was duly found not guilty.

The key issue in the UK is not the relationship between detailed statute law on the one hand and 'customary practice' on the other. Customary practice has long been the usual deciding factor. For example, prior to the 1981 Companies Act there was no legal regulation stipulating that fixed assets with a finite useful life must be depreciated. It was 'customary practice' which ensured that depreciation was normally provided. The Royal Mail case discussed above provides a practical illustration of a decision in which legal regulation played no significant part. Customary practice, whether regulated or arising from habit, is governed and influenced, but not determined in detail, by concepts of a more fundamental nature.

What has evolved over time, however, is how 'customary practice' is to be defined and encapsulated. In 1926 there was no doubt. Customary practice was what was usually done, it was a bottom-up philosophy, emanating from individuals—though from individuals who had been conditioned by a similar professional training process. From 1942, such individualism was tempered by a series of pronouncements from the Institute of Chartered Accountants in England and Wales, called Recommendations on Accounting Principles. The title is revealing. They were recommendations, not requirements. This situation changed in the early 1970s, when the Statements of Standard Accounting Practice (SSAPs) began to appear. These were jointly created and supported by all the UK professional accounting bodies and were 'intended to be mandatory' on all qualified members of those bodies. The idea was that qualified UK accountants would be expected to follow SSAPs, unless of course they could reasonably show that to do so would fail to give a TFV. Failure to properly follow the standards would be, in principle, a matter for disciplinary enquiry by the professional accounting body concerned. This intended mechanism or motivation for ensuring the acceptability of SSAPs became increasingly unsuccessful over the years, leading both to a tendency for companies and auditors to ignore SSAPs and to an increasing tendency for the SSAPs themselves to seek acceptability from preparers, rather than either internal coherence or relevance to users. This last point can easily be demonstrated by reference to 'explanatory statements', published by the ASC as part of SSAP 20 (1983) and SSAP 22 (1984), as follows:

> 'Commentators on the exposure draft were evenly divided between those who agreed with the proposal to translate the profit and loss account of a foreign subsidiary at an average rate for the period and those with a preference for the closing rate. The standard now offers a choice between the two methods. Although it is considered that the closing rate is more likely to satisfy the stated objective that translated results and relationships should not differ significantly from those reported prior to translation, it is acknowledged that the use of this method may require the restatement of previously reported interim periods.' (ASC 1983).
>
> 'The exposure draft proposed that purchased goodwill should be eliminated from a balance sheet by either immediate write-off against reserves or amortisation through the profit and loss account. Reaction to this proposal was varied. Some commentators agreed that it was necessary in the light of divided opinion and practice, to grant an option. Within that group some expressed a preference for immediate write-off.
>
> 'In the light of this reaction, and in view of the fact that immediate write-off is much more common in practice than amortisation, the ASC has decided that it should continue to allow an option, but that it should express a preference for immediate write-off.' (ASC 1984)

The failure to ensure general acceptance gave rise to an obvious question of great practical importance. If an 'official' (but not statutory) pronouncement required treatment X, and the majority of accountants and auditors supported treatment Y, which one would/should be regarded as 'customary practice' in the Royal Mail Case parlance, or as GAAP in modern terminology? Should 'customary practice' be regarded as being what the official pronouncement says, or what the majority of accountants and auditors do?

On this question of pronouncement versus practice, the following view, expressed in the UK context in 1983, is of particular interest.

> 'Once a standard is accepted by the community, the general perception of the true and fair view concept, and presumably the view of the courts, would widen to accept it.

> If, however, the guidance given by the SSAP was disputed by a strong, influential and knowledgeable body of opinion it would seem unlikely that the courts would insist on compliance with the standard. The true and fair view develops by consensus and usage. Rules developed by a committee of professional men, no matter how eminent, cannot arbitrarily change the boundaries of the concept unless such rules meet with professional and social acceptance.'

The author of the above was Sir David Tweedie (Tweedie, 1983), now chairman of the ASB. This view was supported in legal Counsel's Opinion taken at that time by the ASB (Hoffmann and Arden, 1983). This included the statement that if, in relation to a particular Standard, there 'remains a strong body of professional opinion which consistently opts out of applying the SSAP' then the courts will be less likely to regard compliance with it as obligatory in order to give a true and fair view.

The ASC's crisis of confidence, both in its power of logical development of principles and in the validity of the resulting Standards, led to its replacement by the ASB in 1990. This is differently structured from the previous Committee, and, additionally, is supported by references in the Companies Act 1985 as amended by the Companies Act 1989. These differences are widely regarded as giving the ASB and its statements (now called Financial Reporting Standards, FRSs) greater significance than was the case with the earlier body. In other words the suggestion is that the balance of relative importance between 'pronouncement' on the one hand, and practice, habit and popular approval on the other, is shifting further in favour of 'pronouncement'.

This point is strongly supported by the new Counsel's Opinion (Arden 1993), which we now consider in detail. The key sections in respect of accounting standards, in the 1985 Act as amended by the 1989 Act, are Section 256, and paragraph 36A of Schedule 4.

Section 256 states:

1. In this Part 'accounting standards' means statements of standard accounting practice issued by such body or bodies as may be prescribed by regulations.
2. References in this Part to accounting standards applicable to a company's annual accounts are to such standards as are, in accordance with their terms, relevant to the company's circumstances and to the accounts.
3. The Secretary of State may make grants to or for the purposes of bodies concerned with:
   a) issuing accounting standards
   b) overseeing and directing the issuing of such standards, or
   c) investigating departures from such standards or from the accounting requirements of this Act and taking steps to secure compliance with them.
4. Regulations under this section may contain such transitional and other supplementary and incidental provisions as appear to the Secretary of State to be appropriate.

Section 36A, and a corresponding section in Schedule 4A relating to group accounts, require the following (subject to exemptions for small and medium enterprises).

> 'It shall be stated whether the accounts have been prepared in accordance with applicable accounting standards and particulars of any material departure from those standards and the reasons for it shall be given.'

The comments by Counsel on these changes in the law are as follows (Arden 1993).

> 'The changes brought about by the Companies Act 1989 will in my view affect the way in which the Court approaches the question whether compliance with an accounting standard is necessary to satisfy the true and fair view requirement. The Court will infer from Section 256 that statutory policy favours both the issue of accounting standards (by a body prescribed by regulation) and compliance with them: indeed Section 256(3)(c) additionally contemplates the investigation of departures from them and confers power to provide public funding for such purpose. The Court will also in my view infer from paragraph 36A of Schedule 4 that (since the requirement is to disclose particulars of non-compliance rather than of compliance) accounts which meet the true and fair requirement will in general follow rather than depart from standards and that departure is sufficiently abnormal to require to be justified. These factors increase the likelihood, to which the earlier joint Opinions referred, that the Courts will hold that in general compliance with accounting standards is necessary to meet the true and fair requirement.'

She also points out that the ASB is more broadly-based than the predecessor ASC: '....the standard-setting body no longer represents simply the views of the accounting profession'. 'The status of accounting standards in legal proceedings has also in my view been enhanced by the changes in the standard-setting process since 1989'.

Perhaps the key paragraph in the Opinion is the statement that:

> '.....the immediate effect of the issue of an accounting standard is to create a likelihood that the court will hold that compliance with that standard is necessary to meet the true and fair requirement. That likelihood is strengthened by the degree to which a standard is subsequently accepted in practice. Thus if a particular standard is generally followed, the court is very likely to find that accounts must comply with it in order to show a true and fair view. The converse of that proposition, that non-acceptance of a standard in practice would almost inevitably lead a court to the conclusions that compliance with it was not necessary to meet the true and fair requirement, is not however the case. Whenever a standard is issued by the Board, then irrespective of the lack in some quarters of support for it, the court would be bound to give special weight to the opinion of the Board in view of its status as the standard-setting body, the process of investigation, discussion and consultation that it will have undertaken before adopting the standard and the evolving nature of accounting standards.'

This appears strong and clear-cut on the face of it. However, an earlier paragraph in the Opinion states that,

> '.....the question whether accounts satisfy the true and fair requirement is a question of law for the Court. However, while the true and fair view which the law requires to be given is not qualified in any way, the task of interpreting the true and fair requirement cannot be performed by the Court without evidence as to the practices and views of accountants. The more authoritative those practices and views, the more ready the Court will be to follow them.'

This seems like an attempt to 'have it both ways'. We are told that 'the task of interpreting the true and fair requirement cannot be performed by the Court without evidence as to the practices and views of accountants'. If a standard is generally followed by accountants then 'the court is very likely to find that accounts must comply with it'. But if the converse is true—i.e. the practices and views of accountants are not to follow a particular standard, then Arden states that this does not imply that not following the standard is very likely to be accepted by the court as giving a true and fair view.

The implication in the Opinion is that an ASB standard is sufficiently 'authoritative' to represent or even replace the actual 'practices and views of accountants'. Since, as the Opinion explicitly (and favourably) confirms, the ASB is less under the influence of accountants than the ASC was, this implication seems extremely hard to sustain. It is argued that the broader basis and legal support given to the ASB, as compared with the ASC, give it greater overall weight in the business community as a whole. It cannot logically be argued at the same time that this necessarily gives it greater overall weight as an expression of 'the practices and views of accountants'.

It is interesting that the editor of *Accountancy*, in a signed contribution (July 1993), describes the legal Opinion as giving 'the Accounting Standards Board the all-clear to launch and enforce controversial standards on issues where there is no consensus'. He does not claim or imply that the ASB is given the authority to launch or enforce standards *against* a prevailing consensus. Arden herself certainly believes that the ASB would have that extra authority, as the last sentence below makes clear:

> 'The statements referred to in Section 256 [of Companies Act 1985 as amended by Companies Act 1989] are of *standard* accounting practice. Parliament has thus recognised the desirability of standardisation in the accountancy field. The discretion to determine the measure of standardisation is one of the matters left to the Board. By definition, standardisation may restrict the availability of particular accounting treatments. Moreover the Act does not require that the practices required by a standard should necessarily be those prevailing or generally accepted at the time.' (emphasis original)

The fundamental point behind all this is the relationship and balance of authority between TFV, the UK Type A criterion, and the Accounting Standards, part of the UK Type C criterion. Arden is trying to increase the relative authority of Standards (of promulgated GAAP in American parlance), against the authority of TFV as an all-pervasive concept. It is revealing to contrast Arden's view with another comment from the legal perspective. McGee (1991:888), writing in the full context of the 1989 Companies Act and the advent of the ASB, but before the Arden 1993 opinion, gives a different nuance, which he describes in a footnote as a 'welcome new trend'.

> 'A concise summary of the present position would be that the accounting and auditing professions as a whole are only just beginning to take the concept of a true and fair view seriously as a requirement *separate from and superior to* the principle of complying with accounting rules (especially the [Standards]).' (emphasis added)

In her argument, Arden emphasises the importance of the 'status' of the Board and of its 'process of investigation, discussion and consultation', both of which can be argued to increase the authority of its pronouncements. But how does this fit with changes in Standards? Consider deferred tax for example. In 1975 with SSAP11 (ASC, 1975) full deferral was 'required'. In 1978 with SSAP15 (ASC, 1978), and later with SSAP15 (revised) (ASC, 1985), partial deferral was 'required'. The ASB's current views as formalised in a Discussion Paper in 1995 (ASB, 1995b) are that SSAP15 should be replaced with a new FRS 'requiring that tax should be accounted for using the full provision method' (Summary para. 46(a)). Back to square one. Surely this suggests that the rules (Standards) are a (visibly but not surprisingly fallible) attempt to put flesh on the skeleton of TFV. It seems hard to argue that the alternative view, that TFV is by definition 'the collection of rules', can be sustained given such a series of *volte-faces*. Could partial provision really suddenly be fundamentally un-true-and-fair after having been Standard and standard practice for 20 years?

This argument supports a distinction made by Abraham Briloff (albeit in an American context) between every-day, common-sense or 'objective' concepts of fair on the one hand, and the accountant's technical concept of 'GAAP-fair' on the other. He suggests (1972:5/6) that 'financial statements deviated seriously from an objective standard of fairness, and where despite these most serious aberrations the statements were deemed by the auditors to be 'fair in accordance with generally accepted accounting principles (GAAP) '....[T]his 'fair' versus 'GAAP-fair' is a most invidious distinction.'

What are the implications of these UK developments for the Type A, Type B and Type C issue? All three are of course present. Type A (TFV) is legally supreme. Type C, the Standards, although in fact relatively flexible compared with what many other jurisdictions would expect, are increasingly codifying practice. The strength of this codification, and the role of Standards, has increased gradually for half a century, and continues to do so. The precise legal status of this strength is unclear. It is pragmatically clear that TFV, and the Statement of Principles (Type B), can purportedly justify very different Type C rules (e.g. deferred tax). This is consistent with this paper's overall position that Type C rules are arbitrary without a higher level rationale which will guide, but not of course uniquely determine, choice.

## 4. A criterion for adequacy—recent European developments

It is well known that the true and fair view wording found its way from UK Company law into the Fourth EC Directive. The results of this, and the complexities which have arisen as various jurisdictions seek to grapple with a common law-based concept alien to Roman law tradition and legal infrastructure, whether for the purpose of attempting to embrace it or of attempting to evade its implications, have been the subject of much research and discussion. See, for example, Walton (1993), Alexander (1993, 1994, 1996), Ordelheide (1990, 1993, 1996), Burlaud (1993), van Hulle (1993a) and Nobes (1993).

No attempt is made to summarise this material here, but a point to emerge recently is relevant to the thrust of this paper. This concerns what Ordelheide (1993) describes as 'the traditional principle of Roman law 'lex specialis precedes lex generalis'', i.e. the more specific rule takes precedence over the more general rule. Characterising the TFV general clause as lex generalis as compared with the lex specialis of Articles 31 and 34 to 42 of the Fourth Directive, he has therefore:

> 'argued that the European true and fair view has, essentially, to be devised from the explicitly stated accounting principles and rules of the Fourth Directive'.

Ignoring the reference to 'the European true and fair view' (both Alexander (1993, 1994) and Nobes (1993) argue that there is no such thing), Ordelheide is arguing in the terminology of this paper that a Type B approach is superior to, and determines the meaning and implications of, a Type A approach. This of course is the exact opposite of UK tradition and of the explicitly over-riding nature of the (Type A) TFV concept. The present author does not claim expertise on the Roman law implications of the lex specialis precedes lex generalis principle. But two things are clear.

The first of these is that the wording of Article 2 of the Fourth Directive, in para. 5, quite clearly states that the TFV requirement (lex generalis or Type A), precedes and is superior to 'a provision of [the] Directive' (although a conflict is likely to arise only 'in exceptional cases'). The second is that Ordelheide's proposition doesn't work in practice.

This is because all of the Type B attempts at a set of rules or conventions are internally inconsistent. The early list of four 'fundamental accounting concepts' in the UK SSAP2 (ASC 1971), i.e. going concern, accruals, consistency and prudence, explicitly recognised this: 'Where the accruals concept is inconsistent with the prudence concept, the latter prevails'. The ASB in its draft Statement of Principles, ch. 2 (ASB 1995a) refers to the trade-off between relevance and reliability, both coming from the IASC Framework (IASC 1989). The ASB also makes the doubtful suggestion that prudence leads to information which is free from error or bias, although 'prudence' and 'freedom from bias' are apparently inconsistent notions.

One might suggest that an explicit hierarchy of the items in a Type B set should solve the problem. However this would not be at all effective. In some cases e.g. 'prudence' and 'freedom from bias', there is always inconsistency by definition, so if one is permanently 'supra' then the other would cease to exist. In more variable cases, e.g. where accruals and prudence are inconsistent, the debate is simply shifted to whether there is an inconsistency, an issue which would require its own criteria.

Article 31 of the Fourth Directive, to which Ordelheide refers, names six 'general principles', namely going concern, consistency, prudence, accruals, separation of asset and liability items, and continuity of accounting records. Consider the following alternative attempts to apply the 'lex specialis' of Article 31 to the choice between the percentage of completion method and the completed contract method for taking profits on long-term contracts.

The first argument is:

a) prudence is a specifically required 'general principle' of the fourth Directive,
b) the percentage of completion method applied to long-term contracts is imprudent as compared with the completed contracts method, therefore
c) the percentage of completion method is 'incompatible with the fourth Directive'.

The second argument is:

a) the going concern and accrual presumptions are specifically required 'general principles' of the fourth Directive,
b) given the going concern presumption, the enterprise can be assumed to complete the contract, therefore,
c) under the accrual convention where account must be taken of income and charges relating to the financial year, the completed contract method is incompatible with the fourth Directive.

How do we set about choosing between these two arguments? We certainly cannot use Article 31 of the Directive to help us. If the Type B approach so signally fails to resolve the issue, there are only two alternatives. Either we have to make detailed regulations, choosing one alternative on some purely arbitrary basis and providing detailed rules, formulae etc. consistent with it (a Type C approach), or we have to resort to some higher but more nebulous concept such as TFV, economic substance or usefulness (a Type A approach). The same argument, of course, applies to other national or international sets of 'general principles' which are internally inconsistent—which means all of them! This analysis suggests, therefore, that Type B criteria are not, by themselves, capable of providing a defining yardstick for the acceptibility of any particular Type C regulation.

## 5. A criterion for adequacy—recent Australian developments

One of the perceived problems with the Type A approach in general, and with TFV in particular, is the lack of any formal definition. It can be argued, persuasively in the author's view, that the indefinable nature of such a concept is precisely its strength. Like 'justice', for example, it is a concept inherently greater than its precision in terms of any one particular time and place could possibly encapsulate.

This question of definition has been raised in a discussion paper issued by the Australian Accounting Research Foundation (Sadhu and Langfield-Smith, 1993). The authors suggest two alternative definitions, as follows.

1. The following three conditions are necessary for a general purpose financial report to give a true and fair view:
   - the report is presented in accordance with applicable Accounting Standards
   - the report complies with other prescriptive requirements of the Corporations Law (for example, section 294 and Schedule 5 of the Corporations Regulations)
   - the preparation and presentation of the general purpose financial report is in accordance with the appropriate application of Statements of Accounting Concepts.
2. True and fair means that a financial report is capable of meeting the information needs common to users who are unable to command the preparation of financial reports tailored so as to satisfy, specifically, all their financial information needs. These needs include those related to the discharge of accountability to them by the directors of the entity. To be true and fair:
   (a) a financial report must disclose information in a timely manner;
   (c) the information in a financial report must be understandable;
   (b) The information in a financial report must be comparable with that provided by:
      (i) other entities in the reporting period; and
      (ii) by the entity and other entities in previous reporting periods;
   (e) the information in the financial report must be reliable;
   (f) the information included in the financial report must be determined on the basis of its materiality; and

(g) information must be relevant to the assessment of the performance, the financial position, and the financing and investing activities of the entity.

[The peculiar lettering of this second proposition is from the original.]

These definitions do not seem helpful. The first refers to three elements, i.e. Standards (a Type C item), Company Law (a Type C item), and the (Australian) framework or principles statements (a Type B item). Since the 'Statements of Concepts' are internally inconsistent, and, further, any of the three elements in the definition may be inconsistent with any of the others, the absence within the definition of any criteria for deciding between inconsistencies renders the whole thing ineffective. The second suggested definition is in effect a restatement of the typical Type B approach. The elements within it are demonstrably inconsistent with each other (e.g. relevant and reliable) and again the absence of any criteria for preference between the elements renders the definition ineffective.

Since 1990, the financial reporting framework adopted by the Australian Society of Certified Practising Accountants and the Institute of Chartered Accountants in Australia for application by their members engaged in the preparation and audit of general purpose financial reports included mandatory compliance with *both* the Concepts Statements and Accounting Standards. However, in June 1993, the Accountancy Bodies resolved that after consideration of submissions on this matter it was necessary to:

> '...move towards the removal of the mandatory status of Statements of Accounting Concepts. It is intended that these steps will ensure that Australian SACs have a status consistent with internationally equivalent Statements.'

While this move does indeed bring Australia more into line with thinking in a number of other countries, it also suggests that the experiment of regarding Type B concepts as key criteria in their own right was not found to be successful.

## 6. A criterion for adequacy—recent US developments

It is common to find references to 'Anglo-Saxon' accounting, or to Anglo-Saxon influences on accounting. The term is often used extremely vaguely or loosely, but usually carries the implication of embracing both a UK and US input. The validity of the assumption that UK and US can be meaningfully bracketed together in this way is often doubtful.

Following perhaps from the implications of the all-embracing 'Anglo-Saxon' idea, it is commonly implied or stated that TFV (from the UK) and fair presentation (from the US), are alternative terms for what is basically the same notion. A significant example is the IASC Framework for the Preparation and Presentation of Financial Statements, (IASC 1989), para. 46 (the heading is original from the document):

> '*True and Fair View/Fair Presentation.* Financial statements are frequently described as showing a true and fair view of, or as presenting fairly, the financial position, performance and changes in financial position of an enterprise. Although this framework does not deal directly with such concepts, the application of the principal qualitative characteristics and of appropriate accounting standards normally results in financial statements that convey what is generally understood as a true and fair view of, or as presenting fairly, such information.'

This treats conveying a true and fair view, and presenting fairly, as interchangeable. However, Zeff (1993) comments as follows:

> 'In the European setting, 'true and fair view' is used as an 'override', which means that it is intended to be the governing criterion by which financial statements are to be judged. In the United States, however, the governing criterion is conformity with GAAP. 'Present fairly' is defined by reference to conformity with GAAP, and there is no authoritative literature in the United States in which 'present fairly' is explained or defined. In the United States, therefore, 'present fairly' is not in itself a governing criterion by which financial statements are judged by the organised accounting profession and by the Securities and Exchange Commission (SEC).'

It must be noted the US requirement is to present fairly in accordance with generally accepted accounting principles, not to present fairly in accordance with *promulgated* generally accepted accounting principles. Non-promulgated GAAP is not insignificant in the US (see Miller, 1996). It is therefore, hypothetically, possible for 'fair presentation' in the guise of non-promulgated GAAP to override explicit regulation existing in the guise of promulgated GAAP. However, SAS 69 (AICPA 1992) is clearly at great pains to minimise the possibility of this happening in practice. It gives a series of 'sources of established accounting principles that are generally accepted in the US', worded in complicated official jargon, but also gives a rather more easily understandable

**Table 1**
**Extract from SAS 69**

**GAAP Hierarchy Summary**
Non-governmental entities
Established Accounting Principles

a. FASB Statements and Interpretations, APB Opinions, and AICPA Accounting Research Bulletins
b. FASB Technical Bulletins, AICPA Industry Audit and Accounting Guides, and AICPA Statements of Position
c. Consensus positions of the FASB Emerging Issues Task Force and AICPA Practice Bulletins
d. AICPA accounting interpretations, 'Qs and As' published by the FASB staff, as well as industry practices widely recognised and prevalent

**Other Accounting Literature**

Other accounting literature, including FASB Concepts Statements; APB Statements, AICPA Issues Papers; International Accounting Standards Committee Statements; GASB Statements, Interpretations, and Technical Bulletins, pronouncements of other professional associations or regulatory agencies; AICPA *Technical Practice Aids*; and accounting textbooks, handbooks, and articles.

*Source:* AICPA (1992)

summary of sources as applied in practice in the field of non-governmental entities. This is shown in Table 1.

It is vital to remember that this is, explicitly, a hierarchy. If the issue is covered by category (a) then the regulations stated under category (a) must be followed. If not, then if:

> 'an established accounting principle from one or more sources in category (b), (c), or (d) is relevant to the circumstances, the auditor should be prepared to justify a conclusion that another treatment is generally accepted. If there is a conflict between accounting principles relevant to the circumstances from one or more sources in category (b), (c), or (d), the auditor should follow the treatment, specified by the source in the higher category—for example, follow category (b) treatment over category (c)—or be prepared to justify a conclusion that a treatment specified by a source in the lower category better presents the substance of the transaction in the circumstances.'

It is clear from both the general tenor and the specific content of SAS 69 that departure from promulgated GAAP, where such GAAP exists, is extremely unlikely. Zeff has commented (private correspondence 1993):

> 'While it is true that rule 203 of the AICPA Code of Professional Conduct provides that there may be circumstances in which the auditor could believe that adherence to promulgated GAAP would make the financial statement misleading, experienced US auditors tell me they cannot recall ever seeing 'rule 203 exceptions', especially in the financial statements of companies subject to the Securities and Exchange Commission, which would comprehend almost all publicly traded companies.'

Furthermore, there is no requirement that any US Standard-setting body should use the fair presentation criterion as an influence inputting into the creation of its detailed recommendations. Indeed, the whole point is that fair presentation is *not* a criterion in this sense at all. Again, to quote Zeff (private correspondence 1993):

> 'As a matter of fact, acting at the suggestion of the 1978 Cohen Commission on Auditors' Responsibilities, the US Auditing Standards Board actually proposed in 1980 that the term 'fairness' be deleted from the opinion paragraph of the audit report! 'Fairness' is not in US legislation; it is no more than an amorphous standard of quality invoked by the AICPA.'

In summary, Zeff (1995:55) argues that, while 'jurists, financial journalists, members of Congress, and other lay commentators' may see 'present fairly' as an 'essential quality', it is in fact

> 'a term that was developed in the private sector but which seems not to be invoked in professional or regulatory circles. Today, discussions within the major accounting firms, and between the firms or corporations and the SEC's accounting staff over the propriety of accounting or disclosure practices revolve about the question, "is it GAAP?" '

Zeff's view is consistent with that expressed by van Hulle (1997:718). Describing the discussions at the IASC Board meeting which finalised IAS1 (revised) he wrote the following:

> '....Canada and the United States came out strongly against the override. [They] were not in favour of the override because they feared abuses.....The representative of the SEC argued that—although there is an override test in the auditing standards in the US—*no* reg-

> istrant with the SEC had *ever* applied the override in its financial statements.' (emphases added).

The general impression all this analysis gives is that US accounting practice is highly regulation-driven. Van Hulle (1993b) makes the extremely interesting observation that:

> 'from an accounting point of view it is...interesting to see that German accounting practice is closer to US GAAP than to UK GAAP'.

In terms of the *content* of the GAAP, in valuation terms, this is perhaps only partially true. But in terms of the *approach* of the GAAP, i.e. detailed promulgated regulation, and of the approach *to* the GAAP, i.e. acceptance of and subservience to the detailed promulgated regulations, it seems that van Hulle is broadly correct. In both Germany and the US, adherence to the regulation is essential in order to receive a clean audit report. Certainly we can conclude that fair presentation in its US context, and TFV in its UK context, are very different concepts with completely different roles. The US 'fair presentation' wording, widely regarded as an important criterion of the Type A category, appears on closer investigation to be no such thing. In practice the US criterion for the adequacy of a set of financial statements is the detailed promulgated GAAP of the FASB statements, a Type C criterion. From a UK 'pro-meta-rule' perspective it seems hard to disagree with the general tenor of the following quotation (*Accountancy*, August 1997 p. 17), though the syntax as quoted is not excessively elegant.

> 'Are you prepared to sign off accounts that you know are wrong?' Sir David [Tweedie] asked the US. 'They said yes because that's what the rules say, and we were just rolling around on the floor at this stage—it's bizarre what the US does.'

Several implications follow from the above discussion of the US situation. The first, which the author is developing elsewhere, is that the US and the UK differ significantly regarding the issues raised in this paper. The second implication, more explicitly, is that, at least as far as any particular company, and any particular auditor, are concerned, Type C GAAP, and more particularly the Standards are normally the *only* consideration when determining the adequacy of a set of financial statements.

The third implication, and this is doubtless much more tendentious, is that the US position is in the long run unsustainable: when a standard-setter has to choose between alternative proposed rules, and when an individual accountant has to devise an appropriate response to a new or unusual situation, arbitrariness is not enough. Criteria external to and prior to the set of possible detailed rules are required. To 'sign off accounts that you know are wrong' because 'that's what the rules say' is the very negation of the provision of useful information.

## 7. The international scenario

As a final and topical focus, we look at the content of the IAS1 Presentation of Financial Statements (IASC, 1997a) as regards the criterion for adequacy, and at the route leading to the finally agreed version. The Exposure Draft E53 (IASC 1996) differed significantly from IAS1 (revised), and explicitly proposed that no over-ride should be allowed. It is worth considering the key relevant parts of E53 with some care. Our rejection of Type B criteria throws doubt on the validity of para. 16 of E53, which stated as follows:

> 'When no applicable International Accounting Standard exists in respect of a particular recognition, measurement, presentation or disclosure issue, a fair presentation is achieved by selecting and applying accounting policies....and presenting the resulting amounts in a manner which provides relevant, reliable, comparable and understandable information.'

Against what criteria are the accounting policies to be 'selected'? The suggested answer is that the chosen policies should be those which provide 'relevant, reliable, comparable and understandable information'. This answer can be interpreted in two ways, neither of which make sense in the context of para. 16. The first interpretation is that the four adjectives are themselves a list of four separate considerations, all needing to be satisfied. This will not work, however, as the Type B adjectives tend to be conflicting. 'Relevance' and 'reliability' are notorious in this respect (see IASC Framework (IASC, 1989) paras. 32 and 45). 'Understandable' requires different inputs and presentations for different users, and 'comparable' again implies different needs for different purposes and comparisons: proper comparison of X with Y and X with Z may require X's information to be presented in two different ways. Viewed as a set of separate adjectives, the proposed para. 16 is not operable.

The alternative interpretation is that the four adjectives are no more than a euphemism for the true and fair view/fair presentation concept. This is not consistent with the drift of E53, and it would of course turn para. 16 into a circular statement. This is not to deny that these four adjectives might be helpful as a checklist of background ideas in a situation where one is groping towards a solution to some unusual situation which one needs to present fairly. But it is to argue that they do not provide a clear-cut criterion.

As regards Type C regulations, there is no fundamental theoretical reason against regarding a long and detailed list of regulations as *the* benchmark for the acceptability of published financial statements. The problem is that it doesn't work if financial statements are intended to be useful in the sense of para. 12 of the IASC Framework:

> 'The objective of financial statements is to provide information about the financial position, performance and changes in financial position of an enterprise that is useful to a wide range of users in making economic decisions.'

Since there is not only an almost infinitely wide range of users, but also an almost infinitely wide range of enterprises in an almost infinitely wide range of situations requiring an almost infinitely wide range of economic decisions, it follows that detailed prescription, coupled with objectivity and excessive reliability in a narrow technical sense, cannot comprehensively achieve this objective. E53 half accepted this with its claim to 'less rigid pronouncements', but seems to half-reject it with its restriction on 'additional disclosure' (para. 15) and the reference to 'additional analysis' (not additional information!) in para. 105(c).

The essential issue is the relationship between Type A and Type C requirements. There must *be* regulations. Where they are lacking then there must be some *infilling* general requirement, as para. 16 of E53 accepted in a half-hearted, inadequate and ill-thought-out way. But where both A and C are present, what is the relationship between them?

'The essence of the answer is very simple. It is that the Type A criterion is the greater and supreme one. This is so firstly because the inflexibility and stultification of regulation negates its acceptability in the context of the stipulated objective (para. 12 of the IASC Framework, already quoted). Secondly, it is so because if the regulation is going to be changed—as it must be and will be—then some *over-riding* criterion greater than that enshrined within the regulation itself must, as a matter of logical necessity, be employed in order to decide on the changes and developments needed. The proposal in E53 that 'financial statements that are prepared and presented in accordance with International Accounting Standards can meet the fair presentation requirement *only* if they comply in all material respects with all applicable Standards' (para. 17, emphasis added) was neither logically nor pragmatically acceptable.

Para. 12 of the IASC Framework applies, by definition, in an International context. This means that the 'wide ranges' referred to above must be significantly wider than they would need to be in any particular coherent national context. Relevance requires a relationship to community, culture and context. The IASC has always recognised this in practice if not in principle. The original set of IASs were couched in often very general terms and allowed significant options. Even the revised set partly operable from 1 January 1995 and partly still in process, despite the significant reduction in options, retain a lack of detail compared with many (though not all) national jurisdictions. It remains to be seen whether the complete set of revised IASs will be adequately 'less rigid' to allow relevant information throughout the 100+ countries formally involved.

What is disturbingly clear, however, is that there are pressures to significantly increase the rigidity in the medium term. Chief among these pressures seems to be not from Continental Europe and its Roman law tradition but from the US. The US spokesman at a panel in the Chicago 1996 annual conference of the American Accounting Association, Jim Leisenring, the vice-chairman of the FASB and the FASB's representative to the IASC, explicitly said that he felt IASs needed materially more detail. This would of course be fully consistent with our earlier discussion of the US position.

Further the Secretary-General of IASC, Sir Bryan Carsberg, has indicated his views fairly clearly in a discussion on the musical versus the accounting implications of 'harmonisation' (at an Anglo-Polish accounting conference in Cambridge, 12 September 1996). It was argued that 'harmonisation' required usually a variety of different instruments and always a variety of different notes. The Secretary-General's reply was that he thought plainsong was a better musical analogy than harmonisation to indicate his vision of the future. Whether this is consistent with the needs of local relevance as well as of international stock exchanges seems doubtful.

It is clear that the comment letters to IASC on E53 (which included one from the present author on the lines of this paper) caused some debate and rethinking. At its meeting in April 1997 the Board (IASC 1997b)

- tentatively agreed to introduce a requirement to depart from a Standard when, and only when:
- the transaction is, in substance, of a type that seems not to have been considered when the Standard was developed; and
- compliance with the Standard would be misleading, so that a departure is necessary to achieve a fair presentation.

IAS1 as finally agreed and issued has broadly confirmed the April 1997 position, and has indeed gone slightly further in that the suggested requirement that the transaction should be 'of a type that seems not to have been considered when the Standard was developed' is no longer explicitly included.

The key requirements of IAS1 (revised) (paras. 10 and 13) are as follows:

> 'Financial statements should present fairly the financial position, financial performance and cash flows of an enterprise. The appropriate application of International Accounting Standards, with additional disclosure when necessary, results, in virtually all circumstances, in financial statements that achieve a fair presentation.
> In the extremely rare circumstances when management concludes that compliance with a requirement in a Standard would be misleading, and therefore that departure from a requirement is necessary to achieve a fair presentation, an enterprise should disclose:
> (a) that management has concluded that the financial statements fairly present the enterprise's financial position, financial performance and cash flows;
> (b) that it has complied in all material respects with applicable International Accounting Standards except that it has departed from a Standard in order to achieve a fair presentation;
> (c) the Standard from which the enterprise has departed, the nature of the departure, including the treatment that the Standard would require, the reason why that treatment would be misleading in the circumstances and the treatment adopted; and
> (d) the financial impact of the departure on the enterprise's net profit or loss, assets, liabilities, equity and cash flows for each period presented.'

Interestingly, the Standard continues in para. 18 to explicitly suggest an intention to modify Standards or issue interpretations to deal with any situation which threatens to be less than exceedingly rare.

> 'Because the circumstances requiring a departure are expected to be extremely rare and the need for a departure will be a matter for considerable debate and subjective judgement, it is important that users are aware that the enterprise has not complied in all material respects with International Accounting Standards. It is also important that they are given sufficient information to enable them to make an informed judgement on whether the departure is necessary and to calculate the adjustments that would be required to comply with the Standard. IASC will monitor instances of non-compliance that are brought to its attention (by enterprises, their auditors and regulators, for example) and will consider the need for clarification through interpretations or amendments to Standards, as appropriate, to ensure that departures remain necessary only in extremely rare circumstances.'

This seems eminently sensible. It recognises the necessary supremacy of the Type A 'fair presentation' over-ride (hence confirming that IASC fair presentation is not at all the same as US fair presentation) and proposes to channel the results into improving and refining the Type C Standards and interpretation.

The implications and effects of the agreed IAS1 remain to be seen, and should be of considerable interest. The news item in *Accountancy* for August 1997 from which Sir David Tweedie's fulminations have already been quoted underlines the shifting alliances and conflicting attitudes.

> 'IAS1, *Presentation of Financial Statements*, was approved but not without the usual argument over the true and fair override which has been left in the standard. Essentially the US, Canada and Australia do not believe in it but the UK and most European countries do.
> The SEC's Mike Sutton made his disapproval of the final standard clear at the meeting, though he had already written to the IASC to say that the true and fair override was unacceptable to SEC staff.'

It should be clear from the earlier sections of this paper that there is no international consensus on the issues raised. This IASC discussion in a sense merely confirms that impression. IAS1 as currently extant clearly confirms that not to 'be misleading' is an over-riding criterion, above following IAS requirements, i.e. its Type A criterion over-rides its Type C rules. However, the battle-lines are still drawn.

## 8. Conclusion

It is clear that some means of specifying the criteria for adequacy of published general purpose financial reports is essential. This paper looks at three levels at which this can be attempted, the general fundamental concept, the set of conventions and the complete and detailed regulation, which we term Type A, Type B and Type C, respectively. The middle level is unsatisfactory as the benchmark or qualitative standard, because all attempts at creating it have been internally inconsistent. The relationship between the first and the third is becoming both more important and more problematical, as accounting standards of a more or less official nature become more numerous and more ostensibly important in many countries.

It is important to clarify precisely what we are saying about the relationship between A and C, between a general fundamental concept on the one hand, and 'complete' and detailed regulation on the other. We *are* arguing that unequivocal agreement is necessary that either the Type A criterion is superior to the Type C criterion, or the reverse. One and one only must be the deciding factor. We are *not* arguing that the supremacy of a Type A criterion implies no place at all for any detailed Type C specification, nor that the supremacy of Type C specification precludes the recognition of some general Type A criterion as a relevant or important backcloth.

Secondly, it is our opinion that although supremacy of Type C specification may be feasible, at least in the short term, it is inadequate in a dynamic economy, as choice or change in such regulation is inevitably without reference to a more broadly based objective.

We support absolutely the recent comment by McSweeney (1997:707) that:

> '[a] regulative ideal is a normative mechanism within a community which suppresses or reduces the variability of what is potentially an open-ended process. It contributes to the achievement of some degree of conformity and closure.'

Such an ideal guides the debate. It does not, and cannot, itself give 'the' answer.

Consideration of current events in the UK seems to suggest inter-action in both directions between its Type A and Type C influences. There can be no doubt that the need to present an economically-based true and fair view permeates much regulation—e.g. SSAP19, Accounting for Investment Properties, and more recently FRS5, Reporting the Substance of Transactions (ASC, 1981; ASB, 1994). Equally, whatever our precise views on the shifts of emphasis proposed by Arden (1993) as compared with Hoffman and Arden (1983), it is clear that the meaning of TFV in any specific situation is significantly influenced by the extant regulatory framework at that time.

It is interesting to speculate on some possible 'political' implications of our arguments. The fear of an 'Anglo-Saxon' takeover prevalent in parts of continental Europe is shown to be simplistic, as 'Anglo-Saxon' as a single grouping has no real existence. On the other hand, any successful attempt by the US to 'take over' IASC would seem to be against the interests of the British tradition as well as those of continental Europe. And could we even end up with a German-American pact—regulationists all? The operational relationship between Type A and Type C considerations is therefore complicated, and worthy of further in-depth investigation over time and across jurisdictions.

We have argued that a general over-riding requirement is logically necessary, and also that the degree of 'less rigidity' claimed as a necessary condition for the E53 proposals is already under active threat. The IAS 1 (revised) requirements, and the US attitude to them, are both fully consistent with the arguments and opinions expressed in this paper.

Our position cannot be summarised more effectively than by repeating a quotation from an SEC report of 1942, quoted in Tweedie (1983). International enlightenment requires flexibility and mutual understanding, not rules. Comparability on an international basis (E53 p. 6 point 2) requires local relevance plus cross-national understanding, not imposed formulaic practices from traditions removed from the context of enterprise or financial statement user.

> 'We think, however, that too much attention to the question whether the financial statements formally complied with principles, practice and conventions accepted at that time should not be permitted to blind us to the basic question whether the financial statements performed the function of enlightenment, which is their only reason for existence.'

The issue of the extent to which any specific version of the object under discussion fulfils its purpose is a subjective matter. The adequacy of a set of financial statements in performing the function of enlightenment is a prime example.

## References

*Accountancy* (1993). *Compulsion without consensus.* July, p.26; London: ICAEW.

*Accountancy* (1997). 'SEC miffed at 'UK Victory''. August, p.17. London: ICAEW.

AICPA (1992). *The meaning of present fairly in accordance with generally accepted accounting principles in the independent auditor's report* (SAS 69). New York: AICPA.

Alexander, D. (1993). 'A European true and fair view?' *European Accounting Review*, 2 (1): 59–80. London: Routledge.

Alexander, D. (1994). *The true and fair view concept—towards an International perspective.* University of Hull working paper, Hull.

Alexander, D. (1996). 'Truer and fairer uninvited comments on invited comments'. *European Accounting Review*, 5 (3): 483–493. London: Routledge.

Alexander, D. (1997). 'Stability, pseudo-stability, information and pseudo-information'. *European Accounting Review*, 6 (4): 755–766. London: Routledge.

ASB (1995a). *Statement of Principles* (draft), London.

ASB (1995b). *Accounting for Tax.* Discussion paper; London.

ASB (1999). *Statement of Principles* (Exposure draft), London.

ASC (1971). SSAP2. *Disclosure of Accounting Policies.* London.

ASC (1975). SSAP11. *Accounting for Deferred Tax.* London.

ASC (1978). SSAP15. *Accounting for Deferred Tax.* London.

ASC (1985). SSAP15 (revised). *Accounting for Deferred Tax*. London.

ASC (1983). SSAP20. *Foreign Currency Translation*; London: ASC.

ASC (1984). SSAP 22. *Accounting for Goodwill*; London: ASC.

Arden, M. (1993). 'The true and fair requirement. Appendix to foreword to Accounting Standards'. June. London: ASB.

Briloff, A. (1972). Unaccountable Accounting. New York: Harper & Row.

Burlaud, A. (1993). 'Commentary on "A European true and fair view?"' European Accounting Review; 2 (1): 91–98. London: Routledge.

Companies Act (1985). London: HMSO.

Companies Act (1989). London: HMSO.

Gaa, J. (1986). 'User primacy in corporate financial reporting: a social contract approach'. *The Accounting Review*, LX1 (3). American Accounting Association.

Hastings, P. (1962). *The Case of the Royal Mail*, as reprinted in Baxter & Davidson: studies in accounting theory. London: Sweet & Maxwell.

Hoffman, L. and Arden, M. (1983). *Legal opinion on True and Fair*. London: ASC.

IASC (1989). *Framework for the preparation and presentation of financial statements. In: International Accounting Standards*. London: IASC. Annual editions.

IASC (1996). Exposure Draft E53. *Presentation of Financial Statements*. London: IASC.

IASC (1997a). IAS1 (revised), *Presentation of Financial Statements*. London.

IASC (1997b). Update, April. London: IASC.

Kuhner, C. (1997). 'Maintaining economic stability as a motive for statutory accounting requirements'. *European Accounting Review*, 6 (4): 733–754. London: Routledge.

McGee, (1991). 'The 'True and Fair View' debate: a study in the legal regulation of accounting'. *The Modern Law Review*, 54 (6).

McSweeney, B. (1997). 'The unbearable ambiguity of accounting'. *Accounting, Organisations and Society*, 22 (7): 691–712. Oxford: Pergamon.

Miller, M. (1996). *Miller GAAP Guide*. New York: Harcourt, Brace Jovanovich.

Mumford, M. (1994). 'How are accounting standards justified? An Anglo-American perspective', in Burns, J. and Needles, B. (eds). Accounting Education for the 21st Century. Oxford: Pergamon.

Nobes, C. (1993). 'The true and fair view: impact on and of the Fourth Directive'. *Accounting and Business Research*, 24. (Winter): 35–48.

Ordelheide, D. (1990). 'Soft transformation of accounting rules of the Fourth Directive in Germany'. Paris: Les Cahiers Internationaux de la Comptabilitè.

Ordelheide, D. (1993). 'True and fair view: a European and a German perspective'. European Accounting Review, 2 (1): 81–90. London: Routledge.

Ordelheide, D. (1996). 'True and fair view: a European and a German perspective II'. *European Accounting Review*, 5 (3): 495–506. London: Routledge.

Sadhu, M. and Langfield-Smith, I. (1993). *A Qualitative Standard for General Purpose Financial Statements: a Review*. Victoria: Australian Accounting Research Foundation.

Tweedie, D. (1983). 'True and fair rules'. *The Accountant's Magazine*. November.

van Hulle, K. (1993a). 'Truth and untruth about true and fair'. *European Accounting Review*, 2 (1): 99–104, London: Routledge.

van Hulle, K. (1993b). 'Harmonisation of accounting standards in the EC'. *European Accounting Review*, 2 (2): 387–396. London: Routledge.

van Hulle, K. (1997). 'The true and fair override in the European Accounting Directives'. *European Accounting Review*, 6 (4): 711–720. London: Routledge.

Walton, P. (1993). 'The true and fair view in British accounting'. *European Accounting Review*, 2 (1): 49–58. London: Routledge.

Zeff, S. (1993). 'International accounting principles and auditing standards'. *European Accounting Review*, 2 (2): 403–410. London: Routledge.

Zeff, S. (1995). 'A perspective on the US public/private-sector approach to the regulation of financial reporting'. *Accounting Horizons* 9 (1): 52–70. American Accounting Association.

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# Book Reviews

**Accounting for Growth: Information Systems and the Creation of the Large Corporation.** *Margaret Levenstein.* Stanford, CA: Stanford University Press, 1998. ix + 277pp.

This book, based on Professor Levenstein's PhD thesis (1991) at Yale University, is a case study of Dow Chemical Company between 1890 and 1914. The focus is on the evolution of Dow's information system. Information is shown to be both a dependent and independent variable because changes in the firm's strategy and organisational structure affected the design and use of its information system, and the information system also affected the firm's strategy and organisation.

The book has seven chapters, four appendices, extensive notes and 19 figures. Chapter 1 provides a theoretical perspective on information in relation to the subjects of innovation, organisation and strategy. The framework is based on research in industrial organisation, the economics of information and, to a lesser extent, agency theory. Chapter 2 reviews the literature on early manufacturing accounting. Chapter 3 describes Dow Chemical's history by dealing first with the Midland Chemical Company and then with the formation of the Dow Chemical Company, emphasising and contrasting the organisational structure and strategy of the two firms. Chapters 4, 5 and 6 reconstruct the information system and give the details of depreciation accounting, inventory valuation and costing and the evolution of accounting at Dow. The last chapter sums up and concludes that 'changes in the information system sometimes reflect the movement towards modern accounting procedures' and, at other times, reflect 'a conscious choice to reject standard accounting practice in favor of measures that made sense to Dow's chemist-managers' (p. 189).

One of the major questions raised in this thought-provoking and fact-filled history of the first 25 years of one of today's largest corporations concerns whether the role played by accountants in the development of Dow Chemical's information system was a positive or a negative for Dow. The basic thesis is that a firm's information (accounting) system is determined by its own internal economic criteria unless external forces, such as an influential accounting profession (or laws and regulations), limit choices. Of course, in this study period, the accounting profession was in its infancy in the US and the present-day concepts of an 'accounting standard' and 'accepted principle' did not exist. Nevertheless, accountants were beginning to be viewed as experts and their opinions on accounting issues were respected, even if their authority was problematic.

The economic framework is given early on: 'Professional accountants have their own standards, and preferences that can have an independent influence on the design of an information system' but 'Competition will put pressure on firms to drop practices which put them at a competitive disadvantage' unless the standards are mandated (p. 3). While some economists think accountants 'don't think rationally' (p. 6), Dow was relatively 'unhampered' and 'unaided' by professional accountants and employed marginal analysis (p. 19). The early managers had no formal training in accounting (p. 89) but in 1899, Hackenberg, the new Secretary and board member with some accounting training, hired an 'expert accountant' (p. 103). However, the economic environment was changing and the 'ideas and techniques which accountants and managers had at their disposal were of the old economic order' (p. 140). Professional accountants did influence Dow's treatment of overhead expenses but only 'where those standards were consistent with Dow's own strategic vision' (p. 142).

For Midland Chemical Company, the predecessor of Dow Chemical, 'We need not worry that these practices were influenced by demands external to the firm' because no member of Midland management had accounting training (p. 143). 'For better or worse, standard accountancy, such as it existed, had little impact on Midland's treatment of overhead costs' (p. 143). However, the officers and directors of Dow Chemical, formed in 1907, had more background in accounting and outside accountants began to have more influence because new strategies 'required Dow to bring in managerial expertise to aid its chemists and engineers' (p. 147).

A Haskins & Sells (accounting firm founded in 1895 and now part of Deloitte & Touche) audit in 1905 recommended that Dow include depreciation in product cost measures but Dow rejected the recommendation. Yet, Dow did take depreciation into account for investment decisions. Haskins & Sells also recommended that income from the sale of power and chlorine be credited to separate revenue accounts instead of being treated as credits to the cost of producing bleach which had been

Dow's major product (p. 154). Dow adopted the recommendation, although the accounting change made bleach appear to cost more. (Eventually, Dow stopped producing bleach.) 'The change in its information system, initiated by Haskins & Sells, led Dow to reformulate its conception of itself' as a multi-product firm (p. 155). The change had, apparently, already started prior to the recommendation. The procedures used by Dow to allocate joint product costs also were consistent with 'standard' accounting procedure and strategic needs (pp. 156–157).

Another significant recommendation was made by Haskins & Sells in 1906. The accounting firm advised Dow to value inventories at cost (instead of market) and to report profit when goods were sold instead of produced. (Valuation at market was not unreasonable since prices at the time were fixed by a collusive pool and, therefore, could be viewed as certain. On the other hand, the period was one of falling prices.) This had the unintentional but important effect of giving greater emphasis to marketing and sales (p. 159) which was a critical event in Dow's history. The intention in this case, as in the case of joint costs, was to comply with the accountants' demands. 'But Dow also understood that changing how it produced and reported information had strategic implications. As it implemented the Haskins & Sells recommendations, Dow understood that certain changes would complement its strategy' (p. 159).

The conclusion was that some of the changes in the information system during this period were due to outside accountants, 'carrying the weight of outside authority....' But this authority did not mean that accountants exercised 'hegemony' over the information system. The system produced different measures for different purposes. Some were consistent with accounting standards, while others were not (p. 179). On balance, it would appear that the impact of accountants on Dow's information system was a plus, although it is unclear whether the author would agree.

An important contribution of this book is its continuing emphasis on the theme that cost calculations are made for different purposes so that a cost concept can be evaluated only in terms of its purpose. The question of purpose was paramount, and there often is confusion over whether the relevant costs were short-run costs or long-run total average costs (p. 27). Historians who focus only on the cost concept without linking the concept to purpose might be misled. For example, Professor Levenstein argues that while some have concluded that the full costing concept has no managerial purpose other than to provide the historical cost valuation of inventories for financial accounts, others advocated the use of full cost without making a connection to the financial accounts (p. 26).

This insightful book is highly recommended reading for accountants, economists and historians interested in the influence of changes in the organisation and strategy of an early American company on the development and evolution of its information system. By emphasising the interplay between a firm's information system and the economic environment in which the firm operates, it correctly places the questions about a firm's accounting policies in a richer context.

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**Encyclopedic Dictionary of Accounting.** *R. Abdel-Khalik*. Blackwell, 1998. ix + 287pp.

There are several curious aspects of this book. First, it is unclear what the book's purpose or audience is. The 'preface' does not tell us this or anything else about the book, since it is a brief essay on certain accounting problems. The 'encyclopedic' in the title (i.e. 'very full and thorough', OED) is misleading because the entries are merely a selection of topics. They certainly range widely: 'preparing a trial balance' to 'defeasance'. (What sort of reader would want both?) However, at the one end, there are no entries (or index references) for 'debit', 'asset' or 'balance sheet'; and, at the other end, there are no entries for 'discounting', 'joint venture accounting' or 'comprehensive income'. Similarly, the cover's claim of "comprehensive coverage of the whole field of accounting" is unreasonable, given the sparseness of the coverage on cost and management accounting.

Also, given that the publisher is British, the title is again badly misleading because it does not warn the reader that the book is basically American: by my count, 87 (76%) of the 114 contributors are North American, and nearly all (70%) of the few foreigners come from Singapore or Australia (Europe is represented by two Poles and two Britons). Many topics which differ greatly internationally are dealt with exclusively in a US context (e.g. business combinations, consolidated statements, deferred tax, pensions). This is at its worst for 'current value', where there is no reference to practice outside the US, and only two items in the bibliography (both US). Even when there is some international coverage (e.g. asset revaluation), the scope is generally limited to the English-speaking world. The occasional attempt to be broader can go hopelessly wrong.

For example, the Table on goodwill treatments (p. 163) contains more errors than I have ever seen in one Table. How can capitalisation be 'required' by France, the UK and the IASC when at the same time equity write off is 'allowed'? Also, there were no maximum lives of amortisation in France, Germany, Netherlands or the UK despite the table's invention of four different lives. How is it that all these EU countries allegedly use lives which exceed the alleged EU maximum? Incidentally, what is the point of the row which has exactly the same code for all 13 countries in a Table headed 'international comparison'?

Unfortunately, even the US coverage can go wrong (or, at least, be seriously misleading), despite a US writer (presumably an expert) being chosen for the task. For example, we are told that:

> 'Under GAAP, goodwill is amortized over 40 years or over the expected life of the firm, whichever is less. Under the new IRS rules, goodwill has to be amortized over 15 years. [This]...can therefore be a temporary difference if the firm amortizes goodwill over a period other than 15 years.' (p.126)

However, (i) APB Opinion 17 does not refer to the life of the firm but to the life of the goodwill (which might be much shorter); (ii) the IRS rules requiring 15-year amortisation relate only to goodwill where there is an asset acquisition or an election to be treated as such; and (iii) most goodwill (non-tax deductible goodwill) is exempted from creating deferred tax under SFAS 109.

Another bizarre feature of the book is that several topics are repeated. 'Accounting for leases standards' (p.6) covers much the same ground as 'leases' (on p.207). Presumably, the editor was trying to hide this by beginning one of the entries with 'Accounting' (not a sensible procedure in an accounting dictionary). Similarly, 'asset revaluation accounting' (p.30, written by an Australian) overlaps "revaluation" (p.253, written with a New Zealand bias). Again, not surprisingly, 'marketable securities' covers much the same ground as 'securities'; and both are exclusively American.

Another problem with the book is its lack of currency in some entries. For example, the lengthy and detailed entry on 'international accounting standards' does not even go as far as IAS 29 of 1989 or IAS 31 of 1990. Strangely, it does include some IAS changes of 1993, but then nothing subsequently. In a book published in 1998, this is most unsatisfactory in a fast-changing field. Similarly, the entry on 'derivatives' tells us a great deal about an exposure draft (E 48) of 1994 but nothing about a standard (IAS 32) of 1995.

Many of the individual entries in this book are well written and seem accurate. Also, the index is fairly comprehensive, which helps to make up for the strange selection and order of entries. However, these good features cannot overcome the above fundamental problems sufficiently to enable a recommendation of the book.

University of Reading Christopher Nobes

**A Power Control Exchange Framework of Accounting: Applications to Management Control Systems.** *Seleshi Sisaye*, JAI Press, London, xxiii + 231pp.

This book forms volume 5 of the series on *Studies in Managerial and Financial Accounting*, edited by Marc J. Epstein. The aim of the book is to provide 'a framework for behavioral accounting researchers to better understand power control exchange variables that affect the design and implementation of management control systems' (p. xiii). The main thesis is that 'management accountants can benefit greatly from a resource-driven approach to planning and control systems when faced with resource uncertainties and limited information/knowledge about exchange allocation decision dimensions. A resource exchange approach to management control systems can minimize difficulties of coordination and power-dependency relationships associated with resource allocation decisions in multi-divisional organizations' (p. xiii). The book contains a brief introduction, eight chapters and two appendices.

The introduction provides a short statement concerning the aims of the book, its distinctive contribution, and a brief description of the contents of each chapter. Chapters 1–4 lay the foundations for the book by contrasting alternative theoretical approaches to the study of power and control in organisations. Chapter 1 deals with sociological approaches to power and accounting control systems. It deals with the literature on power and control in organisations, beginning with the work of Bernard through to the work of Pfeffer, in a chronological manner that covers the structural-functional (rational choice) and the conflict-pluralistic approaches. The chapter concludes with some discussion of the institutional view of multi-divisional, complex organisations, where definitions of a number of control terminologies are offered.

Chapter 2 contains a discussion of power and accounting control from a social perspective. Here we encounter reference to the restricted and generalised forms of social exchange and their linkages to power. This is followed by an examination of resource allocation decisions and accounting control in the context of the power and social exchange forms discussed at the beginning of the chapter. The chapter concludes by offering a typology of views of organisation and resources according to the structural-functional and conflict-pluralistic approaches.

Chapter 3 is concerned with an examination of management accounting research assumptions that are embedded in the structural-functional approach. Here, the discussion progresses from describing the theory of social organisation (with particular emphasis on resource allocation) to indicators of power under the structural-functional approach. Indicators of power covered are expert power, legitimate power, reward power and referent power; this is followed by a brief reference to organisation contextual variables used by researchers working within the structural-functional approach; e.g. organisation size, levels of hierarchy, degree of task specialisation/complexity/formalisation, degree of centralisation or decentralisation. The assumptions underlying the structural-functional approach are then linked to relevant behavioural accounting research.

Chapter 4 replicates the analysis undertaken in Chapter 3, but from the perspective of a conflict-pluralistic approach. The chapter begins with a critique of the structural-functional approach, highlighting the endemic nature of power and conflict in organisations, followed by a description of the conflict-pluralistic approach, which is presented as a political choice model for resource allocation decisions. A list of surrogate variables developed by previous researchers for proxying the role of power in organisations is then offered, which includes: coalitions; information power; resource dependence; and leadership style. The chapter ends with an attempt to explicate the views of organisational decision-making under the conflict-pluralistic approach and their relevance to management control research.

The last four chapters focus more specifically on resource-exchange processes and management accounting systems in organisations (particularly divisionalised companies). Chapter 5 paves the way for the following chapters by examining the relative availability of resources and capital budgeting decisions. In this chapter, the concepts of slack and scarcity are examined and the discussion concludes with the (rather obvious) statement that the 'perceived availability of resources, relative slack or scarcity, influences the resource allocation decisions processes in organizations' (p. 104). Chapter 6 examines power control as resource exchange processes. A link is forged between behavioural accounting and power control relations, before a discussion is presented of control as a resource exchange process where four models are contrasted: the cooperative exchange model; the competitive exchange model; the distributive exchange model; and the unequal exchange model (all having been alluded to briefly in Chapter 2).

Chapter 7 deals specifically with the application of the power control exchange framework to studying management accounting systems in divisionalised organisations. The chapter begins with a brief review of the literature on capital budgeting and resource allocation decisions, then proceeds to link the power control exchange process to the activities of divisionalised organisations. This is followed by an examination of the basis of power, where reference is made to divisional characteristics, sources of power, and rationale for resource allocation decisions. The chapter concludes by discussing control/influence in the resource allocation processes and the research implications of the power control exchange framework.

Chapter 8 concludes the main part of the book by summarising the contributions of the sociological approaches to the study of management accounting systems and the research implications of the power control framework.

There are two fairly lengthy appendices. Appendix A is a Table arranging in a chronological order a useful review of selected research on power and control in organisations, showing dependent and independent variables, unit of analysis, research design and major findings. Appendix B extends the application of the power control exchange framework of resource allocation decisions to other (apart from divisionalised) for-profit organisations.

Given the sparcity of scholarly books that explicitly link power to organisation decision-making from a management accounting perspective, this book is a useful addition to the field. The book is well written and clearly organised. It reviews a large body of literature, and provides several syntheses in a tabular form (in addition to the appendices) which should serve as a good starting point for post-graduate students and researchers who are not familiar with the literature on power and resource dependency. The book does suffer, however, from self-indulgence and a pre-occupation with the power control exchange framework. Some of the seminal work on power, for example the work of Steven Lukes (1974), is conspicuously absent. The book also fails to develop a critique of the power control exchange approach, in comparison with radical approaches to the study of power (for a review see Clegg, 1988). It views power as a variable that can be simply and fully proxied via some metric that is then subjected to formal quantitative analysis. Readers looking for a more reflective study of power as it relates to management accounting will find the book rather disappointing.

## References

Clegg, Stuart R. (1988). *Frameworks of Power*. London: Sage.
Lukes, Steven (1974). *Power: A Radical View*. London: Macmillan.

University of Manchester Mahmoud Ezzamel

**International Investment—Value Creation and Appraisal.** *Adrian Buckley*, Handelshojskolens Forlag. Copenhagen Business School Press, 1998. 321 pp.

This book is Adrian Buckley's latest contribution to the field of international finance. One must naturally ask how it differs from his previous texts. While the core of the book draws on many of the same concepts discussed in previous texts, the main differences seem to be in the intended audience (the text is aimed more at the researcher, although students on relevant courses would undoubtedly benefit from the text as supplementary reading material), and the adoption of a real options approach (the subtitle of the book) to international investment.

The book aims to explore the impact of real operating options upon international capital investment and appraisal, and to develop a theoretically-sound model of cross-boarder investment evaluation which is appropriate to the growing internationalisation of business.

The introductory chapter places the text in a research context, with an interesting, if rather lengthy, justification of the deductive approach adopted, and discussion of the nature of research and the main models of decision making. The traditional capital budgeting model is then explored in rapid fashion, with evaluation, capital asset pricing and arbitrage pricing models covered very briefly. This early chapter appears somewhat unbalanced, half of it being devoted to tax systems and a complex, rigorous analysis of the theoretical shareholder value created by the tax shield on debt under the classical and imputation systems of corporation tax.

This leads on to an introduction to real options and an extension to the international dimension. Buckley suggests that most international investments have option-like features. There is a helpful discussion on the type of overseas option where a Black and Scholes methodology is most applicable. Interestingly, he argues that, given the B-S model requirements, a decision tree valuation method is more appropriate to most international investment situations. Buckley does not attempt to throw out traditional DCF, but argues for its refinement by incorporating a real options analysis.

In estimating the cost of equity for international investments, extensive empirical evidence is considered based on US, UK and other capital markets for the equity risk premium. The international CAPM literature is then reviewed. The various theories seeking to explain the rationale for corporate expansion are summarised well with particular focus on transaction cost, internalisation, product life cycle and eclectic theories. However, these theories are incomplete unless they recognise the benefits arising from growth, timing and other options linked to the value of flexibility. Buckley therefore introduces a real options theory explanation of foreign direct investment. The chapter on empirical studies of international investment appraisal provides an up-to-date review of the main research studies and discusses the additional complexities found in international investments, differences between parent flows and project cash flows such as tax rate differences between host and how country, and exchange control restrictions.

The book builds up to a discussion of international investment appraisal with real options. This is a synthesis of much of the preceding chapters and incorporates the effect of real options within the international capital budgeting framework. It argues that value is added by creating flexibility through structuring investments in such a way as to confer an option element.

Buckley suggests that poor performance by many international investments may result from a lack of coherent framework for making such decisions. This text provides a step in the right direction for the development of a more coherent framework.

University of Bradford Richard Pike

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**Making Up Accountants: the Organisational and Professional Socialisation of Trainee Chartered Accountants.** *F. Anderson-Gough, C. Grey and K. Robson.* Ashgate Publishing Ltd (Aldershot, 1998). vi + 147pp.

This monograph is an addition to the growing literature on the employment experiences of accounting labour, focusing on the socialisation or 'making up' of new recruits to the ranks of UK chartered accountants. It reports an example of interdisciplinary research in accounting, being firmly based in the discipline of sociology. As such it provides a readily accessible contribution to the field of accounting studies that has emerged in recent years as a result of the progress of the interdisciplinary, and subsequently the critical, accounting projects.

In their research the authors set out to explore three broad theses in relation to the socialisation of chartered accountants. These are outlined in the introductory chapter of the text together with a brief discussion of their significance as a research topic, and the research design employed to progress the study.

The essence of the first thesis is that the socialisation process for trainee chartered accountants involves both formal and informal elements, with the latter playing a critical role in making up accountants. The second thesis is that organisational socialisation, i.e. into the firm, is of greater significance than professional socialisation, i.e. into the occupation. Thirdly, the authors speculate that within different organisations different socialisation processes are operative, fragmenting further the role of the professional accountant.

Chapter 2 provides a brief overview of the UK accountancy profession, before outlining some of the main issues that underpin the sociology of the professions, particularly those of organisational and professional socialisation. It concludes with a section in which the authors discuss the findings of a number of extant studies of the socialisation of accountants. In Chapter 3 details are provided about the methodological foundations of the study, the two firms that were studied, the samples of trainees interviewed and some of the ethical issues involved in the study. There is also an extended account of the mode of qualitative data analysis adopted by the researchers.

Chapters 4, 5 and 6 report the findings in relation to each of the three theses. The importance of developing a range of appropriate social skills is documented in Chapter 4. As the authors indicate in their conclusion to this chapter, while being technically competent is a necessary condition of be(com)ing a chartered accountant, it is not a sufficient condition. Professional socialisation begins at the recruitment stage when the right sort of trainees are identified. They are subsequently groomed in a variety of ways, not least in relation to dress codes and personal appearance, the intention being to ensure that they are equipped with the appropriate repertoire of behaviours for the successful performance of their client-oriented role. The purpose of Chapter 5 is to explore the interplay between this general professional socialisation process and the process of organisational socialisation. What emerges are two interrelated observations which tell us much about the contemporary profession of chartered accountancy.

First, trainees are quite clear that what they are learning to be is professional rather than a professional. Second, the majority of them view their qualification, both in a technical and a social sense, to be a passport to a successful career outside of the profession. Consequently they are prepared to accept whatever their employing firms ask of them in terms of organisational socialisation, because they will emerge equipped with the necessary credentials for career progression beyond the profession. Loyalty, it appears, has been replaced by a hard-edged, instrumental orientation to the making up process. By comparison, Chapter 6 reports much less provocative findings. Although there are some differences in the ways in which the two firms socialise their recruits, and within firms different specialist groups exhibit a beneficial tendency to interact with each other, overall there is no real evidence of these contributing to the fragmentation of the profession. In Chapter 7 the authors conclude by providing an overview of their study, conveniently listing their main findings in their final section.

Being familiar with the work of two of the authors, I had expected to find more of a theoretical emphasis on display in this text. There is no real attempt to engage with some of the more critical, labour process theory-based literature on accountants, nor with contributions from the various feminist perspectives. Instead, the authors have embraced a distinctly sociological perspective. In principle I have no difficulty with this, taking the view that the sociological turn has done much to enrich accounting research in recent years. My concern is that most of the sociology of the professions cited in the text is dated, raising the question of the existence and contribution of later work in this tradition.

Lacking a more extensive theoretical content, the authors are heavily reliant on their empirical material. This is a deceptively long text in which the reported findings account for well over half the content. While I found these chapters to provide a wealth of interesting and provocative insights, and consequently read them very closely, at times I felt them to be laboured. More attention might have been paid to making the presentation of the findings a little more appealing to less committed readers. Given the observations about the instrumentality of many chartered accounting trainees, and their perception of qualification as providing a passport into business, it would be interesting to know more about the socialisation of those chartered accountants training outside of the profession. A small-scale study of such individuals could have been incorporated into this research project without too much difficulty, and may have contributed much of value to readers.

A more ambitious project would be one which compared the experiences of management accounting trainees with their chartered (and certified) counterparts. Such a study would be truly mould-breaking, since to all intents and purposes, the sociology of the accountancy profession which I invoked at the beginning of this review is largely made up of studies of auditing trainees. If it tells us nothing else, this text suggests that it is time for researchers to expand their horizons too.

In summary, this text makes a significant contribution to our understanding of the socialisation of aspiring accountants. As such it should be made compulsory reading for all parties to the accounting education and training process. They will find much to fascinate, irritate and inspire them in its pages.

University of Stirling Robin Roslender

# The sixth interdisciplinary perspectives on accounting conference

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# Guide for Authors

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Papers should be in English and consist of original unpublished work not currently being considered for publication elsewhere. They should be typed and double-spaced. *Four* copies should be submitted, together with a submission fee of £18 for subscribers or £36 for non-subscribers. In order to ensure an anonymous review, authors should not identify themselves, directly or indirectly. Experience has shown that papers that have already benefited from critical comment from colleagues at seminars or at conferences have a much better chance of acceptance. Where the research takes the form of field surveys or experiments, *four* copies of the instrument should be submitted. Where the paper shares data with another paper, *four* copies of the other paper must also be provided.

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A cover page should show the title of the paper, the author's name, title and affiliation, and any acknowledgements. The title of the paper, but not the author's name, should appear on the first page of the text. An abstract of 150–250 words should be provided on a separate page immediately preceding the text. Section headings should be numbered using Arabic numerals.

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Each table and figure should bear an Arabic number and a title and should be referred to in the text. Sources should be clearly stated. Sufficient details should be provided in the heading and body of each table and figure to reduce to a minimum the need for cross-referencing by readers to other parts of the manuscript. Tables and figures should appear at the end of the paper, with its most appropriate placing noted in the paper itself. Diagrams and charts should be submitted in camera-ready form.

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References should be listed at the end of the paper and referred to in the text as, for example, (Zeff, 1980: 24). Wherever appropriate, the reference should include a page or chapter number in the journal or book in question. Only works cited in the paper should be included in the list. Citations to institutional works should if possible employ acronyms or short titles. If an author's name is mentioned in the text it need not be repeated in the citation, e.g. 'Tippett and Whittington (1995: 209) state...'

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Accounting Standards Steering Committee (1975). *The Corporate Report.* London: ASC.

Tippett, M. and Whittington, G. (1995). 'An empirical evaluation of an induced theory of financial ratios'. *Accounting and Business Research*, 25 (Summer): 208–218.

Watts, R. L. and Zimmerman, J. L. (1986). *Positive Accounting Theory.* Englewood Cliffs, NJ: Prentice-Hall.

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# The relative forecast accuracy of UK brokers

**John Capstaff, Krishna Paudyal and William Rees***

**Abstract**—In this study we examine whether there are differences in the accuracy of forecasts produced by brokers for a sample of almost 300,000 forecasts of the earnings per share of UK firms, over a period which spans accounting year ends from 1987–95. We report evidence of differential forecast accuracy which is contrary to much of the existing US research, in particular O'Brien (1985 and 1990). We use a forecast error that is controlled for the size of the firm being forecast, the industry to which the firm belongs, the accounting year being forecast, and the forecast horizon. There is evidence of short term persistence in the relative performance of the brokers across the full sample, and for some brokers there is evidence of forecast superiority over an extended period. We also find evidence that the relative accuracy of brokers differs between industries, which suggests that brokers tend to develop expertise in particular sectors. There are significant differences between brokers' accuracy in seven of the 11 industries in the sample, and in some industries there is evidence of persistently superior performance. Overall, these findings have implications for the construction of the earnings expectations proxies that are used in capital market research.

## 1. Introduction

In this paper we investigate whether there are differences in the accuracy of earnings forecasts produced by different brokerage firms in the UK. A number of studies have investigated differential forecast accuracy, and these have produced mixed results. O'Brien was not able to find evidence of superior forecasting ability between random samples of US brokers (1985), nor between analysts (1987 and 1990). Brown and Rozeff (1980) and Butler and Lang (1991) also found no evidence of superior forecasting ability. However, Stickel (1992) provided evidence that members of an elite group, the American Research Team, produced more accurate forecasts than other analysts. Sinha et al. (1997) reported differences in financial analysts' forecast accuracy contrary to the findings of O'Brien (1990). Evidence from the UK is limited. Taylor and Ward (1985) found some consistency in the relative performance of brokers over a three year period, whilst Atrill and McLaney (1987) found no significant difference between the average ranking of brokers' accuracy for forecasts of 68 different firms made in one year.

This research examines whether there are differences in the average forecast accuracy of individual brokers in the UK using a sample of almost 300,000 forecasts of the earnings per share for UK firms for accounting years ending in 1987–95. Differential forecast accuracy is investigated using a fixed effects model. This model controls for the effects on forecast accuracy of firm size, industry group, accounting year end, and forecast horizon. These are the variables that are commonly found to affect the accuracy of analysts' forecasts (see Brown, 1993). The methodology is similar to that employed by O'Brien (1990) although the variables in her fixed effects model are not identical. We refer to the error term from our fixed effects model as the standardised forecast error (SFE). The SFE may be regarded as an abnormal forecast error. These abnormal errors are measured for each broker and the persistence of the observed forecast performance is analysed from year to year. We find that there are clear differences between the forecast accuracy of various brokers. Out of the 20 brokers examined, the best broker outperformed the benchmark in all nine years while the two worst performers achieved this in only two out of nine years.

There is also evidence of persistence in relative performance with an average year on year correlation in the performance measure of 0.468. These results contrast with those of O'Brien (1985), who was unable to distinguish between the forecast performance of brokers in the US. We also provide evidence of differential forecast accuracy within individual industries. Our results show that he most accurate forcasters tend to vary from inlustry to industry. For example, the most accurate roker measured over the whole sample is the nost accurate in only one industry, whilst other ess accurate brokers overall perform better in articular industries. Our results have implications or the earnings expectations proxies that are used n capital market research. These may be improved y overweighting the forecasts of persistently suerior brokers when constructing a composite orecast.

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Access to a firm's management appears to be a rucial part of the earnings forecasting process ised by brokers in the UK (Arnold and Moizer, 984, Day, 1986, Pike et al., 1993). Its importance n the US is also apparent. Francis and Philbrick 1993), Dugar and Nathan (1995), and Das et al. 1998) all found an association between the enlemic optimism in forecasts and the desire to gain ccess to management. In practice there will be a imit to the number of management relationships hat can be effectively cultivated and developed by single broker. We therefore take the view that he importance of management access, and the ynergies associated with sector specialisation, will ead individual brokers to focus on specific indusry groups in developing expertise and special reationships. If so, one would expect to observe diferences in brokers' performance both across and vithin industries. We note that Mikhail et al.'s 1997) study of US analysts' forecasts was not trongly supportive of industry specialisation exlaining forecast accuracy. However, the authors vere also aware that the lack of significance may e due to the way in which the industry variable vas modelled in the regressions.[1]

This research focuses on brokers rather than ndividual analysts. Our primary aim is to assess vhether there are persistent differences in forecast ccuracy at any observable level, and the size and nanageability of the data set facilitates an investiation of brokers. We also believe it is the broerage firm with which policy and reputation are nore generally associated. Research on the nformation and methods used by analysts has ended to focus on the policies and procedures vithin brokerage firms (Arnold and Moizer, 1984, ay, 1986, Pike et al., 1993). Publications such as he *Investors Chronicle* in the UK also tend to be roker-oriented with regular features such as 'Broers Buy' and 'Brokers Sell', and these are ypically linked with earnings forecasts.

Interestingly, some of the above UK studies reort a variety of approaches to, *inter alia*, the formation of earnings forecasts. Differences in forecast methods between brokers could potentially explain differential forecast performance. Arnold and Moizer (1984) examined share appraisal methods in six brokerage firms. One firm adopted a highly detailed analytical approach based on firms' earnings records and other variables contained in income statements. These were combined with industry and macro variables and fed into computerised models. The predictions of the models were then discussed with their contacts in firms. The authors referred to this as an 'analytical' approach. The system in another brokerage firm was completely different. There were no systematic procedures and forecasts were based mainly on judgement and discussions with management. Financial reports were regarded as important but were examined less formally. This approach was described as 'artistic'.

The other four brokers in the study tended towards the analytical rather than the artistic, but were far less rigorous than the first broker discussed. In all cases the importance of discussions with firms' managers was emphasised. Differences in brokers' procedures were confirmed by Day (1986). A partner or a senior analyst from 15 brokerage firms took part in her study. Analysts were aiming to forecast earnings for use in price-earnings ratio analysis. The methods ranged from formal and systematic to loose and informal. There was a greater tendency towards the informal, with experience of a company and close contact with management counting heavily. It is important to recognise the possible effects of different forecast methods on forecast performance,[2] although we cannot identify the procedures adopted by the brokers in our sample. Mikhail et al. (1997) found that analyst experience improved forecast accuracy. This may also be a factor explaining differential accuracy across brokers if some brokers employ more experienced analysts than others. Again, we cannot identify this within our sample.

The remainder of the paper is organised as follows. Section 2 provides a review of previous research. Section 3 presents the hypotheses to be tested and the research method employed. Section 4 describes the data and Section 5 contains the results and discussion. Finally, our conclusions are in Section 6.

## 2. Previous research

The early studies of earnings forecasts were summarised in some detail by Brown (1993) and more informally by Schipper (1991). These studies have generally shown that analysts' forecasts are more accurate than the predictions of time series models of earnings. The research also suggests that forecast accuracy is conditional on the size of the firm whose earnings are being forecast, the industry sector in which the firm operates, across time as economic circumstances change, and the length of the forecast horizon. Another fairly general finding is that forecasts contain an optimistic bias. The accuracy of forecasts is an important consideration for market participants, and bias reduces accuracy. A systematic bias should be recognised by informed market participants and incorporated into expectations. Deliberate bias may therefore seem to be pointless, and accidental bias untenable in a rational market place. However, a number of possible explanations have been offered, and these may be summarised as processing a bias, strategic bias, and selection bias.

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[1] The point is also made by the paper's discussant, Jacob 1997), who reasons that the time series design biases against inding significance for control variables. The low explanatory ower of industrial specialisation could be due to a lack of ariation in this variable.

[2] We are grateful to an anonymous referee for pointing out this possibility. Of course the survival prospects of a systematically inferior forecast process will be limited.

De Bondt and Thaler (1985) suggested that earnings forecast errors are accidental and result from shortcomings in human information processing. This approach to explaining prediction bias was developed by Kahneman and Tversky (1979) and is due to an overweighting of short term factors when forecasts are made. Forecasters report their true beliefs but they are biased due to a human processing error.

Strategic bias is intentional. Forecasters do not report their true beliefs but include an optimistic bias to gain favour with the managers of the firms being forecast. Francis and Philbrick (1993) provided evidence that optimistic bias is driven by the desire to cultivate relationships with management, or in order to repair damaged relationships. Dugar and Nathan (1995) found that optimistic forecasts help to build and maintain client relationships. Das et al. (1998) argue that a biased forecast can be more accurate than an unbiased forecast. Brokers have incentives to seek information on firms whose earnings are difficult to predict, but not on firms whose earnings are largely predictable on the basis of publicly available information. Access to the managers of 'low predictability' firms may be facilitated by providing optimistic forecasts. The resultant biased forecasts contain better information than unbiased forecasts of 'low predictability' firms. The biased forecasts will be more accurate if the benefit of the incremental information dominates the bias. The authors find that optimistic bias is more pronounced in low predictability firms.

McNichols and O'Brien (1997) provide evidence of a selection bias in forecasts. Their hypothesis is that analysts report their true beliefs but choose not to report when these are unfavourable. The observed distribution of forecasts is therefore truncated with only the favourable forecasts reaching the public domain. Hence, due to a 'self-selection' bias, forecasts appear to contain an optimistic bias.

UK evidence has also reported a systematic bias in forecasts (Capstaff et al., 1995, Hussain, 1996). Hussain (1996) found that the optimistic bias was greater when the firm being forecast was a client of the broker. This implies that broker status could also be a factor in explaining differential forecast performance.

The most influential previous study on differential forecast accuracy is O'Brien (1990). Using the full set of I/B/E/S earnings forecast data covering nine industries over the period 1975–81, she found no evidence of persistent differences in the forecast accuracy of individual analysts. Using a minimum forecast horizon of 120 days, a fixed effects model was employed to control for the impact on forecast error of analyst, firm and year. The analyst variables were not statistically significant in any of the nine industries. In an earlier study, O'Brien (1985) was unable to find evidence of systematic differences in the forecast performance across a random sample of brokers. Other research in the area, notably Brown and Rozeff (1980), Butler and Lang (1991), and Stickel (1992), were also unable to report evidence of persistent differences in the forecast accuracy of individual analysts. Stickel (1992) does, however, report evidence that analysts who have gained membership of the Institutional Investor All-American Research Team produce more accurate forecasts than non-members. Over the period 1981 to 1985 All-Americans significantly outperformed other analysts. These analysts do not demonstrate greater accuracy prior to joining the team, and accuracy diminishes before leaving the team. As membership lasts, on average, for only two years this is not strong evidence of the persistent superiority of individual analysts.[3] Brown and Chen (1991) also found that an independently identified sample of reputable analysts produced more accurate forecasts. Sinha et al. (1997) re-examined the issue of differential forecast accuracy in the light of the extant evidence which was contrary to the 'on the street' perception that superior analysts do exist. First they replicated the analysis of O'Brien (1990)[4] and were able to confirm the finding of no persistent differences in the forecast accuracy of individual analysts. However, when they impose stricter controls for the impact of forecast recency they found significant evidence of differential forecast accuracy.

Sinha et al.'s (1997) evidence suggests that the best estimate of future earnings is provided by analysts with the most recent record of accurate forecasts. For the UK, Taylor and Ward (1985) examined 3,700 forecasts of pre-tax profits made by 22 brokers for 183 firms, and covering the period 1980–83. This sample of forecasts was taken from the *Earnings Guide*. Points were awarded for relatively more accurate forecasts and the results indicated some consistency in the relative performance of brokers. Atrill and McLaney (1987) also used forecasts of pre-tax profits from the *Earnings Guide*. They ranked the six most prolific brokers according to the accuracy of their forecasts of 68 listed firms' earnings in 1983. They found no statistically significant differences in the rankings of the six brokers across these firms.

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[3] Sinha et al. (1997) also make this interpretation of Stickel's (1992) results.

[4] The study does not perfectly replicate O'Brien (1990) as it covers the period 1984–90 as opposed to O'Brien's 1975–82. However, the sample is of similar size and the almost consecutive time periods are of similar length.

Overall, the previous research points to certain characteristics regarding analysts' earnings forecasts that appear to be generally true. Analysts' forecasts are generally more accurate than other predictions of earnings per share, but they tend to be optimistic. This optimism is frequently explained by the desire to curry favour with management, and other evidence has shown the importance to the forecast process of good relationships with management. Forecasts are more accurate for larger firms and over shorter forecast horizons. They tend to differ across industrial sectors and across time. Tests of relative accuracy have mostly been unable to distinguish between brokers' or analysts' forecast ability when investigating a sample drawn from the general population, although some evidence of differential forecast accuracy does exist.

## 3. Hypotheses and research method

This research differs from previous UK research in terms of having a large sample, a methodology which controls for the non-broker variables affecting accuracy, and a focus on different industries. On the basis of previous research we know that forecast accuracy tends to be affected by firm size, industry group, the accounting year earnings being forecast, and the forecast horizon. In the absence of matching forecasts we control for the impact of these variables when assessing the relative accuracy of brokers. Our first hypothesis is as follows:

***Hypothesis 1:*** *There are significant differences between the forecast accuracy of brokerage firms; all other things being equal.*

A forecast error may be defined as:

$$FE_f = \left| A_f - F_f \right| \qquad (1)$$

or alternatively:

$$FE_f = \left| \frac{A_f - F_f}{P_f} \right| \qquad (2)$$

The subscript f indicates a particular forecast on the database irrespective of the forecasted firm, year end, broker, analyst or horizon. Equation (1) shows the forecast error $FE_f$, measured as the absolute value of the outcome $A_f$ minus the forecast $F_f$. Equation (2) is the absolute forecast error deflated by the share price at the time of the forecast, $P_f$. The error metric defined in equation (1) is identical to that used in O'Brien (1990) and Stickel (1992). Where forecasts are matched, as in Stickel's work, it is not important to use a deflator as in equation (2). However, where brokers are compared using error metrics from different forecasts, or of different firms, a broker's mean error will be partly a function of the scale effect. We therefore test our hypotheses using the deflated error metric, in equation (2). We choose to use share price at the time of forecast as the denominator. A number of papers scale by actual earnings but this has the disadvantage of generating outliers where the actual earnings are close to zero. This is less frequent where share price is used as the denominator. The use of share price as a deflator is not uncommon in earnings forecast research.[5] We report all our results based on the deflated error metric, but there were no significant qualitative differences when the undeflated metric was used.

The forecast error is standardised by collecting the error term from the following fixed effects model:

$$FE_f = A + B'(MC_f) + C'(IND_f) + D'(YEAR_f) + E'(HOR_f) + e_f \qquad (3)$$

$FE_f$ is the absolute forecast error from equation (2), $\mathbf{MC}_f$ is the vector of market capitalisation dummy variables indicating in which firm size decile the observation falls. $\mathbf{IND}_f$ is the vector of dummy variables identifying in which of eleven industry sectors the observation falls. The sectors used are the I/B/E/S standard sector groups. These are Finance, Health care, Consumer non-durables, Consumer services, Consumer durables, Energy, Transportation, Technology, Basic industries, Capital goods, and Public utilities. $\mathbf{YEAR}_f$ is the vector of dummy variables identifying in which of nine calendar years, 1987–95, the accounting year end falls. $\mathbf{HOR}_f$ is the vector of dummy variables identifying in which of twelve two-month forecast horizon groups the observation falls. The forecast horizons used in the study range from 20 months before until 3 months after the accounting date (from +20 to −3), split for this purpose into 20:19, 18:17, and so on down to −2:−3. Forecasts continue to occur after the accounting date because of the delay between the year end and the earnings announcement.

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[5] See for instance Brown et al. (1987), Mendenhall (1991), Philbrick and Ricks (1991), and Ali et al. (1992).

$A$ is the intercept in the regression, and $B'$, $C'$, $D'$, and $E'$ are the vectors of estimated coefficients. The error term $e_f$ is zero mean, and it is also zero mean for any sub-sample segmented by any one of the four classification variables. However, it need not be zero mean for a sub-sample identified by more than one classification variable. For example, the mean error term for all 1995 cases is zero, as it is for all of the cases in a particular size decile. However it need not be zero for the sample of cases from, for example, the largest size decile in 1995.

The error term from the fixed effects model is relabelled the standardised forecast error (SFE).[6] These are identified for each broker. A positive SFE indicates that the absolute forecast error is larger than the fixed effects model predicts and a negative error means it is smaller. A negative SFE can be roughly interpreted as indicating above average forecast accuracy.

Hypothesis 1 is then tested by conducting a one-way analysis of variance with the SFE as the dependent variable and the broker as the explanatory variable. We only use the brokers with the 20 largest samples of forecasts in our data set, and classify all other cases as 'others'.

Once the relative forecast accuracy of brokers is assessed, we examined whether the relative forecast performance of brokers is persistent. This information is important for fund managers wishing to select more accurate forecasts for investment decisions, and for capital market researchers seeking the best proxy for market expectations of earnings.[7] We therefore examine the persistence of earnings forecast accuracy.

***Hypothesis 2:*** *There are persistent differences between the forecast accuracy of brokerage firms; all other things being equal.*

We test this aspect of forecast accuracy by ranking brokers by their mean SFE in each year and estimating Pearson and Spearman rank correlations year on year. The 'others' brokers group is eliminated from this test as are any broker/years with less than 50 cases. However, a correlation coefficient may not be indicative of the existence of persistently superior brokers in a group of brokers if the relative performance of the majority of brokers is variable. We therefore also examine the data for this characteristic.

A finding of persistent differences in forecast accuracy should enhance capital market research and investment selection. However, the most accurate brokers overall may not be the most accurate in different industries. Our contention is that brokers will tend to develop expertise in specific industries. The desire of brokers to build significant relationships with firms' managers is well documented. But there will be a limit to the number of management teams with which a single broker can cultivate effective relationships. The allocation of brokers' resources to developing these relationships may also be influenced by the synergies offered by industry specialisation. If individual brokers do in fact focus on specific industries in gaining access to management and developing expertise, this should result in observed differences in forecast accuracy across and within industries. We consider the following hypotheses.

***Hypothesis 3a:*** *There are differences between the forecast accuracy of brokers within individual industries, other things being equal.*

***Hypothesis 3b:*** *The relative performance of forecasters varies between industries, other things being equal.*

***Hypothesis 3c:*** *There are persistent differences between the forecast accuracy of brokerage firms within individual industries, all other things being equal.*

To test these hypotheses we reestimated the fixed effects model omitting the industry dummy variables. This is shown in equation (4).

$$\mathrm{FE_f} = A + B'(\mathrm{MC_f}) + C'(\mathrm{YEAR_f}) + D'(\mathrm{HOR_f}) + e_f \quad (4)$$

$\mathrm{FE_f}$ is the absolute forecast error from equation (2). The fixed effects variables have the same descriptions as for equation (3). $\mathbf{MC_f}$ is the vector of market capitalisation dummy variables, $\mathbf{YEAR_f}$ is the vector of dummy variables identifying the accounting year end, and $\mathbf{HOR_f}$ is the vector of dummy variables identifying in which of 12 two-month forecast horizon groups the observation falls. $A$ is the intercept in the regression, and $B'$, $C'$, and $D'$ are the vectors of estimated coefficients. The error term $e_f$ is relabelled the standardised forecast error (SFE). The SFEs from this model are segmented by industry, and the relative accuracy of brokers in each industry is examined.

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[6] Alternatively this may be defined as average accuracy net of size, industry, year and forecast horizon effects, which is similar to a definition used by O'Brien (1990). Her fixed effects variables were not identical with ours.

[7] This latter point assumes the market successfully identifies the more accurate brokers and uses this information when formulating expectations.

## 4. Data

The data are taken from the individual and consensus historical data files of the Institutional Brokers Estimate System (I/B/E/S). I/B/E/S correct the earnings and forecast data for stock splits and other capital adjustments. The sample details are given in Table 1. For forecasts of UK firms' earnings per share there are 306,144 cases where the forecast, outcome and share price are available.

Of these, 30,004 have forecast horizons which are outside the 24-month window selected. Five more cases are classified as being in an industry sector of their own and the forecast error for a further 2,895 cases are treated as outliers. The outliers are observations that are at the extreme, or detached from, the distribution of forecast errors. The rule applied was that any cases with forecast errors greater than the share price were eliminated. This elimination rule was simply based on visual inspection of the distribution of errors and is a cautious approach when compared to other studies of forecast error which often cull a much larger proportion of the sample. We therefore work with a sample of 273,240 cases. In a minority of these cases there is a missing data point for one of the five variables size, industry, year, horizon and broker. When the data is segmented by any one of these variables, therefore, the total number of cases will be slightly less than 273,240.

## 5. Results and discussion

Table 2 reports the mean forecast errors when the data are segmented according to the market capitalisation of the firm being forecast, the industry to which the firm belongs, the accounting year, and the forecast horizon.

These results are consistent with earlier studies. Forecast errors are generally smaller for larger firms and over shorter forecast horizons. The finance, transportation and capital goods sector exhibit relatively large forecast errors, and health care, consumer non-durables and public utilities have somewhat lower errors. There is considerable dispersion in the mean forecast error between accounting years, with 1991 and 1992 containing relatively large errors. There are also differences in forecast accuracy when the sample is segmented by broker. These differences by broker are not explained by differences in broker size as measured by the number of forecasts. The correlation between number of forecasts and forecast error is not statistically significant, as reported at the foot of Table 2.

The results in Table 2 indicate that the conclusions about differences in the forecast accuracy of brokers cannot be drawn without controlling for firm size, industry, year and forecast horizon. For example, the forecast for a large firm over a short horizon from one broker cannot be compared with a forecast for a small firm over a long horizon from another broker. When estimating the fixed effects equation, we find that the dummy variables for each dimension are collectively significant. In other words, if we repress the dummy variables identifying any one dimension such as industry sector, we find that the explanatory power of the model is significantly reduced.

Table 3 reports the number of forecasts, the mean standardised forecast error (SFE) and its standard deviation, for the 20 largest brokers, and the remaining brokers are placed in the 'others' group.

A negative mean SFE is interpreted as better than expected forecast performance. It occurs when the actual mean forecast error is less than that predicted by the model, i.e. it is the mean of actual less the fitted value from the standardising regression. Thus the best overall performance is recorded by Broker 9008 (−0.0037) and the worst performance by Broker 9014 (0.00437). A one-way analysis of variance of the standardised errors by broker reveals significant differences in their

**Table 1**
**Sample details**

This table records the number of forecasts in the sample. The sample is initially restricted to those cases for which I/B/E/S records actual earnings per share, forecasted earnings per share, year end date, forecast date, industry category and market capitalisation at the balance sheet date and for which the forecast horizon is in the range +20 to −3 months. Subsequent tests may impose further restrictions.

| | |
|---|---|
| Population | 306,144 |
| Extreme horizons | 30,004 |
| No sector | 5 |
| *Outliers | 2,895 |
| Total | 273,240 |

*Our definition of outliers is explained in the text describing this table.

**Table 2**
**Descriptive statistics for the forecast error**

This table records the number of forecasts (N) and the mean forecast error (FError) for the sample segmented by market capitalisation of firm being forecast (deciles, 1 = smallest to 10 = largest), industry sector (defined below), the year of the accounting date, forecast horizons and broker. A simple one-way analysis of variance suggests that all five segmentations are statistically significant. The industry sectors are 1. Finance, 2. Health care, 3. Consumer non-durables, 4. Consumer services, 5. Consumer durables, 6. Energy, 7. Transportation, 8. Technology, 9. Basic industries, 10. Capital goods, and 11. Public utilities.
The forecast error is defined as in equation (2):

$$FE_f = \left| \frac{A_f - F_f}{P_f} \right|$$

$FE_f$ is the forecast error which is the absolute value of the earnings outcome $A_f$ minus the forecast $F_f$. The forecast error is deflated by share price, $P_f$. The subscript f indicates a particular forecast on the database irrespective of the forecasted firm, year end, broker, analyst or horizon.

| *Capitalisation (size of firm)* | | | *Industry sector* | | | *Accounting year* | | | *Forecast horizon* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean FError | | N | Mean FError | | N | Mean Ferror | | N | Mean FError |
| 1 | 26566 | 0.0678 | 1 | 36754 | 0.0434 | 87 | 3766 | 0.0131 | −3, −2 | 18629 | 0.0142 |
| 2 | 27042 | 0.0421 | 2 | 8893 | 0.0164 | 88 | 20112 | 0.0135 | −1,0 | 19498 | 0.0183 |
| 3 | 27181 | 0.0362 | 3 | 33623 | 0.0188 | 89 | 33617 | 0.0216 | +1,+2 | 26615 | 0.0216 |
| 4 | 27296 | 0.0318 | 4 | 57094 | 0.0315 | 90 | 36220 | 0.0361 | +3,+4 | 27266 | 0.0243 |
| 5 | 27251 | 0.0299 | 5 | 4768 | 0.0251 | 91 | 38594 | 0.0509 | +5,+6 | 19885 | 0.0308 |
| 6 | 27246 | 0.0249 | 6 | 10297 | 0.0286 | 92 | 41612 | 0.0470 | +7,+8 | 36218 | 0.0296 |
| 7 | 27292 | 0.0249 | 7 | 3308 | 0.0337 | 93 | 42741 | 0.0313 | +9,+10 | 25662 | 0.0341 |
| 8 | 27322 | 0.0244 | 8 | 10086 | 0.0270 | 94 | 37037 | 0.0208 | +11,+12 | 17503 | 0.0406 |
| 9 | 27332 | 0.0299 | 9 | 35237 | 0.0239 | 95 | 17180 | 0.0157 | +13,+14 | 21692 | 0.0428 |
| 10 | 23931 | 0.0144 | 10 | 61570 | 0.0445 | | | | +15,+16 | 22096 | 0.0422 |
| | | | 11 | 9245 | 0.0113 | | | | +17,+18 | 15766 | 0.0476 |
| | | | | | | | | | +19,+20 | 20049 | 0.0453 |
| | F-test 1114.52<br>p-value 0.000 | | | F-test 567.18<br>p-value 0.000 | | | F-test 1093.65<br>p-value 0.000 | | | F-test 489.63<br>p-value 0.000 | |

**Brokers** 9001 to 9020 = 20 brokers with most forecasts 9999 = others

| Broker | N | Mean FError | Broker | N | Mean FError | Broker | N | Mean FError |
|---|---|---|---|---|---|---|---|---|
| 9001 | 23882 | 0.0364 | 9008 | 14761 | 0.0276 | 9015 | 5305 | 0.0410 |
| 9002 | 19874 | 0.0358 | 9009 | 14023 | 0.0359 | 9016 | 4289 | 0.0352 |
| 9003 | 18534 | 0.0369 | 9010 | 9908 | 0.0268 | 9017 | 4312 | 0.0299 |
| 9004 | 18738 | 0.0309 | 9011 | 9390 | 0.0284 | 9018 | 4426 | 0.0293 |
| 9005 | 17859 | 0.0297 | 9012 | 7176 | 0.0304 | 9019 | 4126 | 0.0247 |
| 9006 | 17449 | 0.0338 | 9013 | 6885 | 0.0311 | 9020 | 3861 | 0.0228 |
| 9007 | 16702 | 0.0365 | 9014 | 5774 | 0.0382 | 9999 | 43505 | 0.0267 |

F-test 48.61 p-value 0.000

Correlation between the number of forecasts (N) and the Mean Forecast Error

Pearson 0.328 (p = 0.158) Spearman 0.368 (p = 0.11)

**Table 3**
**Analysis of standardised forecast error segmented by broker**

This table reports the number of forecasts, and the mean and standard deviation of the standardised forecast errors. The standardised forecast error (SFE) is the error term from the fixed effects model specified in equation (3):

$$FE_f = A + B'(MC_f) + C'(IND_f) + D'(YEAR_f) + E'(HOR) + e_f$$

Where $FE_f$ is the forecast error, $MC_f$ is a vector of market capitalisation dummy variables, $IND_f$ is a vector of industry sector dummy variables, $YEAR_f$ is a vector of accounting year end dummy variables, and $HOR_f$ is a vector of dummy variables indicating the time of the forecast. The subscript f indicates a particular forecast on the database irrespective of the forecasted firm, year end, broker, analyst or horizon.
The explanatory power of the broker segmentation is assessed using a one-way analysis of variance.

| *Broker* | *Forecasts* | *Mean* | *Standard deviation* | *Rank* |
|---|---|---|---|---|
| 9001 | 23451 | 0.00066 | 0.07299 | 13 |
| 9002 | 19585 | −0.00032 | 0.07032 | 11 |
| 9003 | 18458 | 0.00141 | 0.07654 | 17 |
| 9004 | 18514 | −0 .00233 | 0.06064 | 2 |
| 9005 | 17646 | −0.00198 | 0.06116 | 4 |
| 9006 | 17234 | −0.00101 | 0.06569 | 6 |
| 9007 | 16634 | −0.00089 | 0.06915 | 8 |
| 9008 | 14421 | −0.00370 | 0.07119 | 1 |
| 9009 | 13892 | 0.00179 | 0.7388 | 18 |
| 9010 | 9845 | −0.00092 | 0.05475 | 7 |
| 9011 | 9302 | 0.00017 | 0.06387 | 12 |
| 9012 | 7128 | 0.00134 | 0.06189 | 16 |
| 9013 | 6803 | 0.00392 | 0.06052 | 20 |
| 9014 | 5679 | 0.00437 | 0.07303 | 21 |
| 9015 | 5278 | 0.00309 | 0.08199 | 19 |
| 9016 | 4357 | 0.00121 | 0.06330 | 15 |
| 9017 | 4162 | −0.00044 | 0.05914 | 9 |
| 9018 | 4246 | −0.00040 | 0.05360 | 10 |
| 9019 | 9019 | −0.00200 | 0.04825 | 3 |
| 9020 | 3715 | −0.00142 | 0.04386 | 5 |
| Others | 43043 | 0.00105 | 0.05775 | 14 |

ANOVA statistics F-test = 9.88 p-value = 0.0000

performance as measured by our approach. We are therefore able to reject the null hypothesis (1) of no difference between the accuracy of brokers' forecasts. This is in contrast with O'Brien's (1985) comparison of the relative accuracy of brokers' forecasts in the US. As might be expected, the SFEs in Table 3 are significantly correlated with the mean forecast errors reported in Table 2.[8] However, it is clear from the F-statistics in Table 2 that differences in forecast accuracy are partially driven by size, industry, year and horizon. Controlling for these factors should therefore provide a more transparent and reliable measure of relative forecast accuracy.

Our first examination of the persistence of differential forecast accuracy is illustrative. We simply record the number of years during the period studied in which each broker 'outperforms the benchmark'. Table 4 records the mean standardised forecast error for each broker year on year, but it excludes any broker/year in which there were fewer than 50 forecasts.

A broker with a negative SFE is deemed to have outperformed the benchmark, as this reflects a more accurate forecast than would have been expected given firm size, industry, year and forecast horizon. This is tabulated in the last column of Table 4. On this basis one broker (9008) outperforms in nine out of nine years whereas two (9013, 9014) fail to reach the benchmark in seven out of nine years. Table 5 reports the rankings of brokers in each year.

Tables 4 and 5 provide some evidence of persistence in that consistently superior performance can be identified, e.g. brokers 9004 and 9008. The

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[8] Pearson correlation = 0.57 (p = 0.007). Spearman rank correlation = 0.61 (p = 0.003).

**Table 4**
**Broker performance year by year**

This table reports the mean standardised forecast errors (SFEs) for each broker in each year 1987-95. The SFE is the error term from equation 3:

$$FE_f = A + B'(MC_f) + C'(IND_f) + D'(YEAR_f) + E'(HOR_f) + e_f$$

$FE_f$ is the forecast error, $MC_f$ is a vector of market capitalisation dummy variables, $IND_f$ is a vector of industry sector dummy variables, $YEAR_f$ is a vector of accounting year end dummy variables, and $HOR_f$ is a vector of dummy variables indicating the time of the forecast. The subscript f indicates a particular forecast on the database irrespective of the forecasted firm, year end, broker, analyst or horizon.
The final column records the number of years of better than average performance over the number of years for which performance is measured, for each broker (na = not applicable, less than 50 forecasts recorded for this particular year.)

| *Broker* | *1987* | *1988* | *1989* | *1990* | *1991* | *1992* | *1993* | *1994* | *1995* | *ALL YEARS* | *Outperformed benchmark* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9001 | −0.00481 | −0.0021 | 0.00095 | 0.00009 | 0.00445 | −0.00128 | 0.00221 | 0.00005 | −0.00225 | 0.00066 | 4/9 |
| 9002 | 0.00286 | −0.00164 | −0.00147 | −0.00295 | −0.0003 | 0.0038 | 0.00045 | −0.00212 | −0.00164 | −0.00032 | 6/9 |
| 9003 | na | na | 0.0012 | 0.0016 | 0.00321 | −0.00014 | 0.00353 | −0.00021 | −0.00089 | 0.00141 | 3/7 |
| 9004 | −0.0068 | −0.00236 | −0.00321 | 0.00168 | 0.00029 | −0.00536 | −0.0023 | −0.00315 | 0.00177 | −0.00233 | 7/9 |
| 9005 | 0.0101 | 0.00063 | −0.0012 | −0.00166 | −0.00344 | −0.00264 | −0.00408 | −0.00199 | 0.00044 | −0.00198 | 6/9 |
| 9006 | 0.01124 | 0.00018 | 0.00139 | −0.00087 | −0.00351 | −0.00194 | −0.00061 | −0.00099 | −0.00041 | −0.00101 | 6/9 |
| 9007 | na | na | 0.00362 | −0.00118 | −0.00166 | −0.00204 | −0.00134 | 0.00041 | −0.00042 | −0.00089 | 5/7 |
| 9008 | −0.00796 | −0.00201 | −0.0053 | −0.01755 | −0.01478 | −0.00543 | −0.00097 | −0.00204 | −0.0004 | −0.0037 | 9/9 |
| 9009 | −0.00834 | −0.00077 | −0.00053 | 0.00866 | −0.00034 | 0.00114 | 0.00344 | 0.00143 | −0.00109 | 0.00179 | 5/9 |
| 9010 | −0.0033 | 0.00406 | −0.00061 | −0.00363 | −0.00685 | 0.00258 | −0.00019 | 0.00124 | 0.00308 | −0.00092 | 5/9 |
| 9011 | na | 0.00484 | 0.00139 | 0.00344 | −0.00084 | 0.00221 | −0.00193 | −0.00378 | −0.00029 | 0.00017 | 4/8 |
| 9012 | −0.0052 | 0.00562 | −0.00085 | 0.00014 | 0.00142 | −0.00008 | 0.00413 | 0.00064 | 0.00312 | 0.00134 | 3/9 |
| 9013 | −0.00186 | 0.00452 | 0.00669 | 0.00072 | −0.00133 | 0.00874 | 0.00701 | 0.00564 | 0.00227 | 0.00392 | 2/9 |
| 9014 | −0.00316 | 0.00243 | −0.00041 | 0.00248 | 0.00942 | 0.00747 | 0.00082 | 0.00552 | 0.00383 | 0.00437 | 2/9 |
| 9015 | na | 0.0162 | 0.00211 | −0.00081 | −0.00047 | 0.00869 | 0.0013 | −0.00015 | −0.00257 | 0.00309 | 4/8 |
| 9016 | 0.01083 | 0.01635 | 0.00805 | 0.00584 | 0.00632 | −0.00289 | −0.00375 | −0.00619 | −0.00161 | 0.00121 | 4/9 |
| 9017 | −0.00357 | −0.00116 | −0.00266 | 0.00036 | 0.00623 | 0.01576 | na | na | na | −0.00044 | 3/6 |
| 9018 | −0.0004 | 0.00045 | −0.00016 | −0.00047 | −0.00298 | na | na | na | na | −0.0004 | 5/5 |
| 9019 | 0.00471 | −0.00094 | 0.00515 | 0.00178 | −0.01078 | 0.05131 | na | na | na | −0.002 | 3/6 |
| 9020 | −0.00152 | −0.00178 | −0.00218 | 0.0014 | 0.01922 | na | na | na | na | −0.00142 | 3/5 |
| 9999 | 0.00197 | 0.00185 | 0.0023 | 0.00268 | 0.00071 | 0.00066 | −0.00139 | 0.00233 | 0.00025 | 0.00105 | 1/9 |

**Table 5**
**Forecast accuracy: Ranking of brokers in each year, 1987 to 1995**

| | *1987* | *1988* | *1989* | *1990* | *1991* | *1992* | *1993* | *1994* | *1995* | *All* |
|---|---|---|---|---|---|---|---|---|---|---|
| 9001 | 5 | 2 | 12 | 11 | 16 | 7 | 12 | 10 | 2 | 13 |
| 9002 | 12 | 5 | 5 | 4 | 12 | 13 | 9 | 4 | 3 | 11 |
| 9003 | na | na | 13 | 16 | 15 | 8 | 14 | 8 | 6 | 16 |
| 9004 | 3 | 1 | 2 | 5 | 13 | 2 | 3 | 3 | 12 | 2 |
| 9005 | 14 | 11 | 6 | 6 | 5 | 4 | 1 | 6 | 11 | 4 |
| 9006 | 16 | 10 | 14 | 8 | 4 | 6 | 7 | 7 | 8 | 6 |
| 9007 | na | na | 18 | 7 | 7 | 5 | 5 | 11 | 7 | 8 |
| 9008 | 2 | 3 | 1 | 1 | 1 | 1 | 6 | 5 | 9 | 1 |
| 9009 | 1 | 8 | 9 | 20 | 11 | 10 | 13 | 14 | 5 | 17 |
| 9010 | 7 | 13 | 8 | 3 | 3 | 12 | 8 | 13 | 14 | 7 |
| 9011 | na | 15 | 14 | 18 | 9 | 11 | 4 | 2 | 10 | 12 |
| 9012 | 4 | 16 | 7 | 12 | 14 | 9 | 15 | 12 | 15 | 15 |
| 9013 | 9 | 14 | 19 | 14 | 8 | 16 | 16 | 16 | 13 | 19 |
| 9014 | 8 | 12 | 10 | 17 | 19 | 14 | 10 | 15 | 16 | 20 |
| 9015 | na | 17 | 17 | 9 | 10 | 15 | 11 | 9 | 1 | 18 |
| 9016 | 15 | 18 | 20 | 19 | 18 | 3 | 2 | 1 | 4 | 14 |
| 9017 | 6 | 6 | 3 | 13 | 17 | 17 | na | na | na | 9 |
| 9018 | 11 | 9 | 11 | 10 | 6 | na | na | na | na | 10 |
| 9019 | 13 | 7 | 16 | 2 | 2 | 18 | na | na | na | 3 |
| 9020 | 10 | 4 | 4 | 15 | 20 | na | na | na | na | 5 |

**Table 6**
**Correlation statistics for annual performance measure**

This table records the correlation between the assessed performance of each broker in each year and their performance in the subsequent year. The results exclude the influence of any broker/year with less than 50 forecasts, so the sample of brokers may not be identical in every year. Panel one is based on Pearson correlations and panel two on Spearman rank correlations.

Pearson correlations

| | *1988* | *1989* | *1990* | *1991* | *1992* | *1993* | *1994* |
|---|---|---|---|---|---|---|---|
| 1989 | 0.659* | | | | | | |
| 1990 | 0.301 | 0.485† | | | | | |
| 1991 | 0.098 | 0.093 | 0.632* | | | | |
| 1992 | −0.081 | 0.108 | −0.089 | −0.225 | | | |
| 1993 | −0.050 | 0.130 | 0.158 | 0.145 | 0.544† | | |
| 1994 | −0.172 | 0.079 | 0.124 | 0.154 | 0.629* | 0.664* | |
| 1995 | −0.166 | −0.049 | −0.049 | 0.026 | 0.176 | 0.170 | 0.515† |

Average year on year correlation = 0.468

Spearman rank correlations

| | *1988* | *1989* | *1990* | *1991* | *1992* | *1993* | *1994* |
|---|---|---|---|---|---|---|---|
| 1989 | 0.644* | | | | | | |
| 1990 | 0.411‡ | 0.358‡ | | | | | |
| 1991 | 0.005 | −0.059 | 0.656* | | | | |
| 1992 | 0.227 | 0.175 | 0.113 | 0.064 | | | |
| 1993 | 0.080 | 0.061 | 0.173 | 0.199 | 0.574† | | |
| 1994 | 0.186 | 0.229 | 0.230 | 0.076 | 0.554† | 0.608* | |
| 1995 | 0.180 | −0.225 | −0.050 | −0.107 | 0.093 | −0.025 | 0.385 |

*significant at the 1% level
†significant at the 5% level
‡significant at the 10% level

overall persistence of relative forecast accuracy is assessed more formally with correlation statistics. These are reported in Table 6.

The mean standardised forecast errors of the 20 brokers by year are correlated using both Pearson and Spearman rank correlation statistics. Since the number of brokers is small the correlation coefficients have to be quite large to be significant. The Pearson correlations from one year to the next are all positive and statistically significant apart from 1990 to 1991. A simple average of these statistics is 0.468. These findings are generally confirmed by the rank correlation. We also pool the sample and correlate each broker's mean SFE for each year with their performance in the following year. The Pearson correlation is 0.206 and significant at the 1% level. We therefore conclude there is a significant persistence in year on year forecast performance and reject the null hypothesis (2) that forecast performance in one year has no predictive content for the subsequent year's results. However, this predictive content appears to be shortlived. If the one-year correlations are ignored, then of the remaining 21 cells only one of the Pearson and two of the Spearman coefficients are positive and significant.

The correlation statistics indicate that the persistence of the relative accuracy of brokers is shortlived. This does not mean, however, that there are no brokers who are superior over longer periods. Tables 4 and 5 suggest that this may be the case with broker 9008. Consistently superior performance of individual brokers is not to be revealed in correlation statistics if the relative performance of the remaining brokers is highly variable. We therefore look more closely at individual broker performance, in particular by examining the relative performance of brokers in different industries.

### *5.1. Analysis by industry*

The broker rankings in Tables 3 and 5 are based on the mean SFE over the full sample. However, the brokers with the highest overall rankings may not also be the most highly ranked in specific industries. While individual brokers may provide forecasts for a large number of different firms, they may well have expertise in particular industries. There are obvious synergies to such a strategy. Also, brokers cannot realistically cultivate effective management relationships with all the firms being forecast. Industry expertise is not revealed by the overall accuracy of brokers. A broker with a lower overall ranking than another broker may outperform that broker in a specific industry.

The I/B/E/S database specifies 11 industry groups. Our earlier results have shown that brokers' forecasts differ across industries. We now investigate whether there are differences between brokers within industries using the fixed effects model in equation (4) which adjusts for firm size, accounting year and forecast horizon. The standardised forecast errors (SFEs) from the model are segmented by industry. Using a one-way analysis of variance, we found statistically significant differences between the mean SFEs of brokers in seven of the 11 industries. These are reported in Table 7, which shows the mean SFEs and the rankings of brokers in each of these seven industries. The full sample statistics are also shown.

We are able to reject the null hypothesis (3a) of no differences in the relative accuracy of brokers within individual industries, although this did not extend to all the industries in the sample. The results in Table 7 have some interesting features. The most accurate broker overall (9008) is the most accurate only in the capital goods industry. This broker performs well in most other industries but is not the most accurate. Brokers who have high overall rankings tend to be highly ranked in one or more industries, but not in all of them. Also, there are brokers whose overall rankings are relatively poor but have high rankings in particular industries. Brokers 9012 and 9018 are examples of this. Out of the 20 brokers studied 16 have a top 3 ranking in at least one industry, and no broker fails to get into the top 6 in at least one industry. This evidence is consistent with rejection of the null hypothesis (3b) that the superior forecasters vary between industries, and is consistent with the view that brokers tend to develop expertise in specific sectors. Researchers and investors seeking the best proxies for market expectations should therefore differentiate between brokers across industries.

By definition, the top ranked brokers in an industry will have produced relatively superior performance for at least part of the period studied, but this is not necessarily indicative of persistence over time. We therefore examined broker performance year by year in each industry. There were seven industries where the differences between brokers' forecast accuracy were statistically significant. For each of these industries we measured the SFEs and ranked the brokers year by year. The evidence from these industries is mixed.[9] In three industries, capital goods, consumer services and basic industries, there is strong evidence of year on year persistence in the correlation statistics. In the remaining four industries the significant correlations are scattered unsystematically across the years and in several cases they are negative. Hence the evidence from some industries is consistent with the overall finding of short term persistence in brokers' relative forecast accuracy. However, there is persistence over longer periods for

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[9] The detailed statistics are not reported but are available on request.

**Table 7**
**Forecast accuracy: ranking of brokers in different industries**

This table ranks brokers according to the accuracy of their forecasts in different industry groups. The ranking is based on the mean standardised forecast error (SFE) which is the residual from a fixed effects model. The model adjusts for firm size (capitalisation), year of forecast, and forecast horizon as follows:

$$FE_f = A+B'(MC_f)+C'(YEAR_f)+D'(HOR_f)+e_f$$

Excluded from the table are industries in which a one-way analysis of variance revealed no significant differences between the SFEs of different brokers. The mean SFE and ranking are shown for each broker in the seven industries where there were statistically significant differences between brokers. The figures for the full sample of all industries are also listed. The number of forecasts and the ANOVA significance statistics are reported in the bottom panel.

| | *Finance* | | *Consumer non-durables* | | *Consumer services* | | *Technology* | | *Basic industries* | | *Capital goods* | | *Public utilities* | | *FULL SAMPLE* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Broker | SFE | rank | SFE | rank | SFE | rank | SFE | rank | SFE | rank | SFE | rank | SFE | rank | SFE | rank |
| 9001 | 0.00153 | 13 | 0.00101 | 14 | 0.00205 | 17 | 0.00197 | 15 | −0.0009 | 6 | −0.00109 | 7 | 0.00036 | 12 | 0.00066 | 13 |
| 9002 | −0.0016 | 2 | 0.00093 | 11 | 0.00196 | 16 | 0.00103 | 12 | −0.000147 | 4 | −0.00063 | 8 | −0.00059 | 7 | −0.00032 | 11 |
| 9003 | 0.00196 | 14 | −0.00053 | 7 | −0.00002 | 10 | 0.00185 | 14 | 0.00044 | 9 | 0.00266 | 12 | −0.00094 | 2 | 0.00141 | 16 |
| 9004 | −0.0026 | 1 | −0.00049 | 8 | −0.00087 | 9 | 0.00082 | 11 | −0.0007 | 7 | −0.0056 | 3 | −0.00061 | 6 | −0.00233 | 2 |
| 9005 | −0.0014 | 3 | −0.00087 | 6 | −0.00208 | 4 | −0.00604 | 1 | −0.00258 | 3 | 0.00017 | 9 | 0.0001 | 11 | −0.00198 | 4 |
| 9006 | 0.00079 | 10 | 0.00188 | 17 | −0.00124 | 5 | 0.00108 | 13 | 0.00196 | 14 | −0.00532 | 4 | −0.00208 | 1 | −0.00101 | 6 |
| 9007 | −0.001 | 7 | −0.00006 | 9 | 0.00063 | 12 | −0.00204 | 4 | 0.00251 | 15 | −0.00353 | 5 | −0.00084 | 4 | −0.00089 | 8 |
| 9008 | −0.0014 | 3 | 0.00093 | 11 | −0.0012 | 6 | −0.00165 | 5 | −0.00107 | 5 | −0.00753 | 1 | −0.00038 | 9 | −0.00370 | 1 |
| 9009 | −0.0012 | 5 | −0.00308 | 2 | 0.0012 | 15 | −0.00557 | 2 | 0.00026 | 8 | 0.00623 | 14 | −0.00017 | 10 | 0.00179 | 17 |
| 9010 | na | na | −0.00004 | 10 | 0.00059 | 11 | 0.01061 | 17 | 0.00166 | 12 | −0.00708 | 2 | 0.00194 | 14 | −0.00092 | 7 |
| 9011 | −0.0012 | 6 | −0.00111 | 4 | −0.00107 | 8 | 0.0007 | 9 | 0.00187 | 13 | 0.00647 | 15 | −0.00081 | 5 | 0.00017 | 12 |
| 9012 | 0.00136 | 12 | −0.00511 | 1 | 0.00328 | 19 | 0.00907 | 16 | 0.00152 | 11 | 0.00261 | 11 | −0.00091 | 3 | 0.00134 | 15 |
| 9013 | 0.00684 | 16 | 0.00133 | 16 | 0.00226 | 18 | −0.00256 | 3 | 0.00366 | 17 | 0.01081 | 17 | 0.00255 | 16 | 0.00392 | 19 |
| 9014 | na | na | 0.0024 | 18 | 0.00101 | 13 | −0.0011 | 6 | na | na | 0.01854 | 18 | 0.00245 | 15 | 0.00437 | 20 |
| 9015 | na | na | 0.0065 | 19 | −0.0029 | 3 | na | na | 0.00261 | 16 | 0.00973 | 16 | 0.00085 | 13 | 0.00309 | 18 |
| 9016 | −0.0005 | 9 | na | na | 0.00611 | 20 | na | na | −0.00268 | 2 | na | na | −0.00056 | 8 | 0.00121 | 14 |
| 9017 | na | na | −0.00215 | 3 | 0.00115 | 14 | 0.00016 | 8 | na | na | 0.00421 | 13 | na | na | −0.00044 | 9 |
| 9018 | 0.00128 | 11 | 0.00129 | 15 | −0.00624 | 1 | 0.00076 | 10 | 0.00145 | 10 | 0.00123 | 10 | na | na | −0.00040 | 10 |
| 9019 | 0.00204 | 15 | −0.00092 | 5 | −0.00553 | 2 | na | na | na | na | na | na | na | na | −0.00200 | 3 |
| 9020 | −0.0009 | 8 | 0.001 | 13 | −0.00116 | 7 | −0.00074 | 7 | −0.00372 | 1 | −0.0016 | 6 | na | na | −0.00142 | 5 |
| N | 36224 | | 33314 | | 56299 | | 9895 | | 34946 | | 60613 | | 9085 | | 267407 | |
| F-test | 2.45 | | 3.54 | | 2.79 | | 2.8 | | 2.58 | | 12.99 | | 2.79 | | 9.88 | |
| p-value | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | |

independently identified brokers in some of these industries. To be useful for capital market research and for investment analysis it is persistence in forecast accuracy that is paramount. Therefore, it is important to identify any brokers with this regularity. In six out of the seven industries there is evidence that some brokers are persistently more accurate than others. These were brokers with at least four successive years as one of the top five forecasters. The forecast performance of brokers in the finance industry, however, was somewhat erratic over the years. We are able to reject the null hypothesis (3c) of no persistence in the relative accuracy of brokers' forecasts within individual industries, but this does not apply to all industries.

The results suggest that composite forecasts that are used to mimic market expectations can be improved by overweighting the forecasts of superior brokers. The superior brokers differ between industries, although evidence of persistent superiority does not exist in all industries. In most cases we found that persistence is shortlived, which suggests that the *ex ante* identification of superior brokers should be based largely on current performance. The results of this research indicate that overweighting the forecasts of some brokers is likely to improve a composite forecast, but they do not provide a precise formula for this weighting. This remains a matter of judgement.

## 6. Conclusion

This research has examined a large sample of individual earnings per share forecasts by brokers in the UK covering the period 1987–95. The errors in brokers' forecasts of firms' earnings per share are adjusted for the effects of some of the variables that are known to affect accuracy. These are the size of the firm being forecast, the industry to which the firm belongs, the accounting year being forecast, and the forecast horizon. The results show that there are distinct differences in forecast accuracy across the 20 brokerage firms examined, and this differential performance normally persists for at least one year. These results contrast with most of the US research, but are consistent with the results for analysts recently reported by Sinha et al. (1997). We were also able to identify individual brokers with superior performance which persisted for more than one year, while other brokers were consistently less accurate.

The finding of differential performance across the whole sample was not indicative of who are the best forecasters in every industry. The most accurate brokers overall were found to be highly ranked in at least one industry, but not in all industries. Brokers with middle or low overall rankings produced highly ranked forecasts in specific industries. This is consistent with the view that different brokers have expertise in different industrial sectors, and this expertise is reflected in the accuracy of their forecasts. Evidence of differential forecast accuracy, and its persistence over time, was found in some industries. Knowledge of differential forecast accuracy is important information for capital market researchers for improving the composite earnings forecast that is used as a surrogate for market expectations. This research has provided some evidence of persistent differences in the accuracy of forecasts produced by individual brokers. Future research might fruitfully focus on individual analysts and on specific firms.

## References

Atrill, P. and McLaney, E. (1987). 'Stockbroker's profit forecasts: are some forecasters more reliable than others?' *The Investment Analyst*, 83: 29–32.

Ali, A., Klein, A. and Rosenfeld, J. (1992). 'Analysts' use of information about permanent and transitory earnings components in forecasting annual EPS'. *Accounting Review*, 67 (1): 183–198.

Arnold, J. and Moizer, P. (1984). 'A survey of the methods used by UK investment analysts to appraise investments in ordinary shares'. *Accounting and Business Research*, 14: 195–207.

Brown, L. D. (1993). 'Earnings forecasting research: its implications for capital market research'. *International Journal of Forecasting*, 9: 295–320.

Brown, L. D. and Chen, D. M. (1991). 'How good is the all-American research team in forecasting earnings?' *Journal of Business Forecasting*, 9: 14–18.

Brown, L. D., Hagerman, R. L., Griffin, P. A. and Zmijewski, M. E. (1987). 'An evaluation of alternative proxies for the market's assessment of unexpected earnings'. *Journal of Accounting and Economics*, 9: 159–193.

Brown, L. D. and Rozeff, M. S. (1980). 'Analysts can forecast accurately!' *Journal of Portfolio Management*, 6: 31–34.

Butler, K. C. and Lang, L. H. P. (1991). 'The forecast accuracy of individual analysts: evidence of systematic optimism and pessimism'. *Journal of Accounting Research*, 29 (1): 150–156.

Capstaff, J., Paudyal, K. and Rees, W. (1995). 'The accuracy and rationality of earnings forecasts by UK analysts'. *Journal of Business Finance and Accounting*, 22 (1): 69–87.

Day, J. F. S. (1986). 'The use of annual reports by UK investment analysts'. *Accounting and Business Research*, 16: 295–307.

Das, S., Levine, C. B. and Sivaramakrishnan, K. (1998). 'Earnings predictability and bias in analysts' earnings forecasts'. *Accounting Review*, 73 (2): 277–294.

De Bondt, W. F. M. and Thaler, R. H. (1990). 'Do security analysts overreact?' *American Economic Review*, 80 (2): 52–57.

Dugar, A. and Nathan, S. (1995). 'The effect of investment banking relationships on financial analysts' earnings forecasts and investment recommendations'. *Contemporary Accounting Research*, 12: 131–160.

Francis, J. and Philbrick, D. (1993). 'Analysts' decisions as products of multi-task environment'. *Journal of Accounting Research*, 31: 216–230.

Hussain, S. (1996). 'Over-reaction by security market analysts: the impact of broker status and firm size'. *Journal of Business Finance and Accounting*, 23 (9) & (10): 1,223–1,244.

Jacob, J., (1997). 'Discussion of do security analysts improve their performance with experience?' *Journal of Accounting Research*, 35 (Supp): 159–166.

Kahneman, D.; and Tversky, A. (1979). 'Prospect theory: an analysis of decision under risk'. *Econometrica*, 47 (2): 263–291.

McNichols, M. and O'Brien, P. C. (1997). 'Self-selection and analyst coverage'. *Journal of Accounting Research*, 10: 53–83.

Mendenhall, R. R. (1991). 'Evidence on the possible underweighting of earnings-related information'. *Journal of Accounting Research*, 29 (1): 170–179.

Mikhail, M. B., Walther, B. R., and Willis, R. H. (1997). 'Do security analysts improve their performance with experience?' *Journal of Accounting Research*, 35: 131–157.

O'Brien, P. C. (1985). 'An empirical analysis of analysts' forecasts of earnings per share'. PhD dissertation, University of Chicago.

O'Brien, P. C. (1987). 'Individual forecasting ability'. *Managerial Finance*, 13: 3–9.

O'Brien, P. C. (1990). 'Forecast accuracy of individual analysts in nine industries'. *Journal of Accounting Research*, 28 (2): 286–304.

Philbrick, D. R. and Ricks, W. E. (1991). 'Using value line and IBES analyst forecasts in accounting research'. *Journal of Accounting Research*, 29 (2): 397–417.

Pike, R., Meerjanssen, J. and Chadwick, L. (1993). 'The appraisal of ordinary shares by investment analysts in the UK and Germany'. *Accounting and Business Research* (Autumn): 489–499.

Schipper, K. (1991). 'Commentary on analysts' forecasts'. *Accounting Horizons*, 5 (4): 105–121.

Sinha, P., Brown, L. D. and Das, S. (1997). 'A re-examination of financial analysts' differential earnings forecast accuracy'. *Contemporary Accounting Research*, 14 (1): 1–42.

Stickel, S. E. (1992). 'Reputation and performance among security analysts'. *Journal of Finance*, 47 (5): 1,811–1,836.

Taylor, S. J. and Ward, C. W. R. (1985). 'Relative accuracy of earnings forecasts made by UK stockbrokers'. *The Investment Analyst*, 75: 15–17.

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# Determinants of audit report lag: further evidence from Hong Kong

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**Abstract**—This study examines whether the audit report lag (ARL) of Hong Kong companies is associated with auditor business risk and audit firm technology. The study is based on a sample of 393 Hong Kong companies for the 1991–1993 period. Financial condition and family ownership/control of a company are used as proxies for auditor business risk, and the structured/unstructured audit approach is used as a proxy for audit firm technology. Other variables, such as the number of subsidiaries, nature of client's business, company size, unexpected positive earnings news and nature of audit opinion, are included as control variables. Regression results show that there is a positive association between the audit report lag and the financial risk index for Hong Kong companies, suggesting that companies with a weak financial condition are associated with longer audit delays. The results also show that companies audited by audit firms using the structured audit approach have longer audit delays. The findings on the association between ARL and the company's family ownership and control suggest that family-owned/controlled companies may have shorter audit delays, though the results are statistically not significant. Larger companies appear to provide motivation for shorter audit delays.

## 1. Introduction

The timeliness of audit reports is considered to be important because it affects the timeliness of financial statements which convey financial information to investors (for example, see Dopuch et al., 1986; Field and Wilkins 1991; Loudder et al., 1992). Timely disclosure of financial information through audited financial statements plays an important role in reducing the asymmetric dissemination of financial information (for example, see Statement of Financial Accounting Concepts No. 2, 1980). The timeliness of audit reports, however, is influenced by a number of factors. An understanding of these factors can assist in improving the audit planning process and in enhancing the efficiency of audit work (for example, see Newton and Ashton 1989; Bamber et al., 1993). In addition, an analysis of these factors may also help investors to understand the causes of delays in audit reports. A number of studies have been conducted in economically developed countries, such as the US, Canada and the UK. (Ashton et al., 1987; Carslaw and Kaplan 1991; Bamber et al., 1993) to examine the determinants of audit delays. With increasing globalisation of trade and rapid development of international capital markets, there is a need to have a better understanding of the determinants of audit report lag in the newly developed countries.[1]

Recently, Ng and Tai (1994) examined the determinants of audit delays for Hong Kong companies. Their study, however, suffered from an omitted variables problem and the lack of a comprehensive empirical framework. It omitted two important variables, namely auditor business risk and audit firm technology, which were considered to be significant for ARL (for example, see Bamber et al.'s [1993] study). This study examines whether auditor business risk and audit firm technology would affect the audit report lag of Hong Kong companies.

Auditor business risk for US companies is proxied by the company's financial condition and ownership concentration, and audit firm technology is reflected by the audit approach, structured or unstructured (Bamber et al., 1993). Unlike US companies, the ownership of Hong Kong companies is not widely dispersed. Therefore, the variable of ownership concentration used for US companies will not be meaningful in Hong Kong. Instead, the most appropriate variable for Hong Kong com-

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[1] Given the pivotal position of Hong Kong capital markets, an understanding of audit report lag of Hong Kong companies in particular will provide useful information to investors, especially international investors.

panies will be family ownership and control since 31% of Hong Kong companies in our sample of 393 are family-owned/controlled. Consistent with the principal agent theory and corporate control literature (Jensen and Meckling, 1976), auditors' exposure will be limited for family-owned/controlled companies which will reduce their business risk, ceteris paribus.[2] Thus, audit report lag can be expected to be shorter for family-owned and controlled Hong Kong companies. With regard to the impact of the company's financial condition on audit delays, financially weak companies can be expected to be associated with longer audit delays (Bamber et al., 1993). The use of structured and unstructured audit approach[3] suggests that audit report lag can be expected to be longer for audits conducted using the structured audit approach. We expect that audit delays for Hong Kong companies will also be longer when a structured audit approach is used.

In addition to auditor business risk and audit firm technology, the comprehensive ARL model, developed by Bamber et al. (1993), includes a number of other factors in the analysis. These factors are classified into the following three groups: (1) the extent of audit work required, namely audit complexity, (2) audit firm technology, and (3) incentives for timely reporting. These factors are included in our analysis as control variables.

The results show that financially weak companies exhibit longer audit delays than financially strong companies, and that the structured audit approach is associated with comparatively longer audit delays than the unstructured audit approach for Hong Kong companies. Our findings, however, do not fully support the hypothesis that family-owned/controlled companies[4] are associated with shorter audit delays. Results on the control variables show that larger companies are associated with shorter audit delays and that industrial companies are found to experience longer audit delays. The results, however, do not support the findings of the earlier study (Ng and Tai, 1994) that audit complexity, proxied by the number of subsidiaries of the client company, will be associated with longer audit delays.

The remainder of the paper is structured as follows: Section two provides a brief review of prior research. Research hypotheses are developed in Section three, and research method is presented in Section four. Section five contains results, and Section six presents a discussion of results and conclusions.

## 2. Prior research

Several studies have been conducted to examine audit delays for companies in the economically developed countries, such as the US, Canada and the UK. Earlier studies examined the impact of selected company characteristics on ARL using univariate tests. Company size was found to be negatively associated with ARL (e.g. Courtis, 1976; Davis and Whittred, 1980). Courtis (1976) also reported that financial companies had comparatively shorter audit delays. Garsombke (1981) detected audit delays for US companies using January through March as year-end. Whittred's (1980) study found that companies receiving qualified audit opinions were associated with longer audit delays.

In view of inconclusive findings of univariate studies, multivariate tests were conducted on the association between ARL and company characteristics. Ashton et al. (1987) conducted the first study on a sample of 488 US companies audited by Peat Marwick Mitchell and Company (now KPMG) during 1981–82. Their results indicated that ARL was significantly associated with revenues, audit complexity, internal control quality, the mix of interim and final work, and whether the company was publicly traded.

In a later study, based on 465 Canadian companies for the 1977–1982 period, Ashton et al. (1989) found that ARL was associated with the client's industry, type of audit opinion, reporting of extraordinary items, and the sign of net profit for the year. Three additional variables, namely total assets, client's financial year-end, and audit firm size were found to be significant for some years of the study.

Carslaw and Kaplan (1991) used a sample of New Zealand companies for 1987 and 1988 to examine the effects of seven variables on ARL. These variables, adopted from the Ashton et al. (1989) study, included total assets, client industry, the sign of net profit, extraordinary items, type of audit opinion, financial year-end and audit firm size. The results indicated that the variables of total assets and the sign of net profit were significantly associated with ARL for both years. In addition, client industry, reporting of extraordinary items, company control and debt proportions were found to have significant association with ARL for a single year.

More recently, Bamber et al. (1993) developed a comprehensive ARL model to examine the impact of different variables on audit delays for a sample of US companies. The model covers three important dimensions of audit work: (1) extent of audit work required, (2) incentives for timely reporting, and (3) audit firm technology. The extent of audit work required consists of three factors, namely auditor business risk, audit complexity and other work-related factors. Incentives for timely audit reports consist of company size and earnings news, and the audit firm technology refers to the structured or unstructured audit approach. Bamber et al.'s (1993) results indicated that ARL was an increasing function of factors affecting the audit work, which related to auditor business risk (proxied by concentration of client ownership and client's financial condition), audit complexity (proxied by client industry), and other work-related factors (proxied by extraordinary items, net losses, and qualified audit opinions). The results also suggested that incentives for a timely audit report could decrease the ARL. Additionally, structured audit firms took a longer time to audit.

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[2] Agency problems, however, may also be created by other factors such as leverage.

[3] See Bamber et al. (1993) for a more detailed discussion of divergent viewpoints.

[4] As explained later in the section on the Measurement of Variables, data on family ownership percentage cannot be reliably obtained because of the interlocking problem and hierarchical ownership structure.

The determinants of ARL for Hong Kong companies have been examined by Ng and Tai (1994). Based on data for two years, their study indicated that only company size and degree of diversification were significantly associated with ARL. Extraordinary items and financial year-end were also found to be associated with ARL for a single year only. However, their study suffered from an omitted variables problem. It did not include two variables, namely auditor business risk and audit firm technology, identified by Bamber et al. (1993), which were found to significantly affect ARL. This study, therefore, examines whether ARL is associated with auditor business risk (proxied by financial condition and family ownership and control) and with audit firm technology within the framework of a comprehensive ARL model developed by Bamber et al. (1993). The results of this study will also indicate whether the inclusion of auditor business risk and audit firm technology will have an impact on the association between ARL and other company characteristics as indicated by Ng and Tai's (1994) findings.

## 3. Hypotheses

### *3.1. Financial condition*

It has been argued that companies with a weaker financial condition are likely to expose auditors to greater audit risk (Arens and Loebbecke, 1991). There is ample empirical evidence to suggest that companies with weaker financial condition are more likely to provide optimistic information in financial statements, and some of these companies could experience failure at a later date (Palmrose, 1987; Kinney and McDaniel, 1989). Therefore, auditors are expected to react to the additional audit risk associated with the company's weak financial condition by increasing the level of audit efforts (Pratt and Stice, 1994). Thus, the audit work required is likely to be more detailed, and it would take a comparatively longer time to complete. This expectation is tested using the following hypothesis:

**H1:** *There is a positive association between ARL and the financial risk index of a company, meaning that the higher risk index, the longer the ARL.*

### *3.2. Family ownership and control*

According to agency theory and corporate control literature, a broad-based ownership of companies increases the auditor's work because a large number of investors with diverse interests will be relying on the client's audited financial statements (e.g., see Arens and Loebbecke, 1991; Jensen and Meckling, 1976). Auditors will have a much broader risk exposure which could lead to litigation. Conversely, it can be argued that the auditor's business risk will be limited if the company is family-owned and controlled, because the auditor's exposure is primarily limited to investors who have inside information. The family-owned and controlled companies, therefore, could be expected to have comparatively shorter ARL, and this expectation is tested using the following hypothesis:

**H2:** *There is a negative association between ARL and family ownership/control of Hong Kong companies, meaning that family-owned/controlled companies will have shorter ARL.*

### *3.3. Audit firm technology*

Bamber et al. (1993) evaluated divergent viewpoints on the association between ARL and audit firm technology, and found conflicting evidence with regard to costs and benefits of the structured audit approach and the impact of audit firm technology on ARL.[5] After evaluating different arguments over the controversy of structured versus unstructured audit approach, they concluded that 'the weight of the theory and evidence cited above suggests that clients of structured audit firms will likely experience longer total audit report lag than clients of unstructured audit firms, on average' (Bamber et al., 1993). The findings of their study provided the evidence that the structured audit approach is associated with a longer ARL. Based on this evidence, the structured audit approach for Hong Kong companies can also be expected to be associated with a comparatively longer ARL. This expectation is tested using the following hypothesis:

**H3:** *There is a positive association between ARL and structured audit approach, meaning that the structured audit ap-*

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[5] For different viewpoints, see Mullarkey (1984); Dirsmith and Haskins (1991); Sullivan (1994).

*proach will result in a longer ARL as compared to the unstructured audit approach.*

## 4. Research method

### 4.1. Data collection

This study covers a three-year period from 1991 to 1993. All Hong Kong companies are screened on the basis of the following criteria: (i) availability of financial statements for the study period for calculation of ARL by manually extracting the audit report date from the financial statements, and (ii) availability of data for all independent and control variables from the *Global Vantage* database.[6] As a result of this screening process, the total sample consists of 393 observations. The number of sample companies by year and industry are given in Table 1.

### 4.2. Research design

The association between the dependent variable of ARL and independent variables of family ownership/control, company's financial condition and audit firm technology is examined by including a number of other relevant company-specific characteristics as control variables. Based on the findings of prior studies, the following were included in the study: the extent of audit work required in terms of audit complexity, other work-related factors, and incentives for timely reporting. Audit complexity is proxied by the lines of business and the nature of the client's business, as used in the Bamber et al. model (1993). Since Hong Kong accounting regulations do not require segmental reporting as required in the US, the number of subsidiaries is used as a proxy for the client's lines of business.[7] To examine the impact of the nature of the client's business, companies are divided into industrials and non-industrials. The other work-related factors include extraordinary items, loss reported by the companies and the nature of audit opinion. The incentives for timely audit reports are

**Table 1**
**Number of sample observations by year and by industry**

*Panel A: Sample selection*

| *Global Vantage* database | | N |
|---|---|---|
| | 1991 | 222 |
| | 1992 | 222 |
| | 1993 | 222 |
| | | **666** |
| After excluding missing data | | |
| | 1991 | 126 |
| | 1992 | 131 |
| | 1993 | 136 |
| | | **393** |

*Panel B: By industry*

| **Industry** | N |
|---|---|
| Financial | 16 |
| Manufacturing | 114 |
| Property and hotel | 130 |
| Utilities | 7 |
| Transportation and communication | 41 |
| Wholesale and retail | 56 |
| Services and others | 29 |
| | **393** |

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[6] *Global Vantage* database contains detailed information for more than 11,000 companies from 70 countries representing Europe, Asia, the Pacific Rim, America, Africa, and the Middle East, along with a wealth of market data for local market indexes and world currencies. The *Global Vantage* database was selected over the *PACAP* database because the former contained more companies at the time of study and had comparatively fewer missing values for variables used in this study.

[7] This proxy was also used in the earlier study on Hong Kong companies (Ng and Tai, 1994).

proxied by company size and unexpected positive earnings (Bamber et al, 1993).

The following multiple regression model is used:

$$ARL = \alpha + \beta_1 FO + \beta_2 FC + \beta_3 ST + \beta_4 SUB + \beta_5 IND + \beta_6 EI + \beta_7 LOSS + \beta_8 AO + \beta_9 SIZE + \beta_{10} NEWS + e$$

where

ARL = Natural log of number of days between the client's fiscal year-end and the audit report date

*Experimental variables*

FO = dummy variable, 1 if company is family-owned/controlled, otherwise 0

FC = financial condition as defined by Zmijewski's financial condition index.

ST = dummy variable, 1 if the audit firm employs structured audit approach, otherwise 0

*Control variables*

SUB = square root of number of subsidiaries

IND = dummy variable, 1 if company is classified as industrials, otherwise 0

EI = dummy variable, 1 if company reports extraordinary items, otherwise 0

LOSS = dummy variable, 1 if company reports loss, otherwise 0

AO = dummy variable, 1 if audit opinion is qualified, otherwise 0

SIZE = natural log of total assets

NEWS = dummy variable for positive unexpected news, 1 if $(EPS_t - EPS_{t-1})/EPS_{t-1}$ is positive, otherwise 0

### *4.3. Measurement of variables*

The dependent variable ARL is defined as the number of days between the client's fiscal year-end and the audit report date. The natural log of ARL is used for regression analysis.[8]

Ownership concentration is generally measured by the percentage of the company's shares held by the directors.[9] Because of the pyramidal structure of Hong Kong companies and the interlocking problem, it is difficult to determine the percentage ownership of directors in Hong Kong companies. Therefore, it was decided to differentiate between family-owned and controlled and non-family-owned and controlled companies. Mok et al.'s (1992) study indicates that more than 50% of outstanding shares of several Hong Kong companies are owned by members of the same family, and these companies are also controlled by the family members. Thus, in this study, Mok et al.'s classification is used to identify family-owned and controlled and non-family-owned and controlled companies.

Financial condition of the company has been determined on the basis of a risk (bankruptcy) index. Different bankruptcy models have been developed for US companies, but so far no model has been developed for Hong Kong companies. The Zmijewski (1984) model used by Bamber et al. (1993), based on return on assets (the ratio of net income to total assets), financial leverage (the ratio of total debt to total assets), and liquidity ratio (the ratio of current assets to current liabilities), appears to be relevant in determining the financial condition (risk index) of Hong Kong companies. In the absence of any other specific model for Hong Kong companies, we also use Zmijewski's (1984) model in this study to calculate the risk index of the company.

$$ZFC = -4.336 - 4.513(ROA) + 5.679(FINL) + 0.004(LIQ)$$

where ZFC represents an estimated risk index of the financial condition of the company, which indicates the company's propensity to fail. The higher the value of the index, the higher the propensity to fail and the weaker the financial condition. Conversely, the lower the value of the index, the lower the propensity to fail and the stronger the financial condition.

Bamber et al. (1993) classified the following three Big Eight audit firms (now Big Five) as the firms which used the structured audit approach: Deloitte, Haskins and Sells (DH&S), Peat Marwick, Mitchell and Co (PMM), and Touche Ross (TR). Because DH&S and TR have been merged into Deloitte Touche Tohmatsu (DTT), two Big Five audit firms (DTT and PMM) are classified as those firms with structured audit approach. Since all Big Five international audit firms follow a similar audit approach worldwide,[10] DTT and PMM have been identified as the audit firms using the structured audit approach in Hong Kong. The audit approach used by other auditors would be classified as an unstructured audit approach.

Company size is represented by the natural log of total assets. Earnings news is defined as the difference between the current year's EPS and the prior year's EPS, and this difference is scaled by the prior year's EPS. If this scaled difference is positive, the unexpected earnings announcement is positive and vice versa. Since there is no requirement for segmental reporting, the number of lines of business is represented by the number of subsidiaries of the company, and square root of the number of subsidiaries is used in the analysis.

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[8] Log transformation has been used to normalise the distribution and to linearise the model (see Kleinbaum, 1978; Maddala, 1977 for transformation justification).

[9] The percentage ownership criteria used in the western countries, especially in the US, would not be relevant for the Hong Kong environment.

[10] Another recent study (Lau, 1997) in Hong Kong found evidence that the Big Six (now Big Five) international firms follow similar audit approach and the classification of structured versus unstructured audit approach is similar to that in the Bamber et al.'s (1993) study.

## 5. Results

### *5.1. Descriptive statistics*

Descriptive statistics on the dependent variable ARL are given in Table 2.

The results in Panel A of Table 2 indicate that the mean audit delay for the total sample is 105.88 days compared to the 109.4 days indicated by the Ng and Tai (1994) study. The mean audit delay for individual years is almost the same as for the combined period. The audit delays, however, are longer than those reported for US companies, which are between 22.5 and 55.2 days for banks and building industries respectively (Bamber et al. 1993). This difference suggests that Hong Kong auditors normally take a longer time than US auditors to complete the audit. The observed delay is probably influenced by the fact that the listing requirements of the Stock Exchange of Hong Kong allow companies to publish their annual reports within 180 days following the end of the financial year, which is much longer than the 90 days allowed in most other countries. This lax requirement may not motivate management and auditors to release the financial statements and audit report early. In addition, a comparatively narrower ownership base of Hong Kong companies may not provide sufficient investor pressure on management to issue the financial statements and audit report early.

The results on different industry groups as shown in Panel B of Table 2 indicate that the average audit delay is the longest for the manufacturing group (112.94 days) and shortest for utilities (60.14 days). The results also show that variation in the average audit delays for different industry groups, except for utilities, is not significant. It is between 92.41 days (transportation and communication) and 112.94 days (manufacturing).

Descriptive statistics and correlations of independent variables are given in Table 3.

Panel A of Table 3 shows that there are no significant differences in the mean values of most independent variables across different years, except for extraordinary items (EI), audit opinion (AO), and earnings news (NEWS). The number of companies with family ownership and audited by the structured audit approach has been constant

**Table 2**
**Descriptive statistics on the dependent variable audit report lag (ARL) by year and by industry group**

*Panel A: By year*

| | *1991* | *1992* | *1993* | *Pooled 1991-1993* |
|---|---|---|---|---|
| **N** | 126 | 131 | 136 | 393 |
| **Mean** | 106.32 | 106.13 | 105.23 | 105.88 |
| **Median** | 103 | 105 | 105 | 105 |
| **STDEV** | 28.23 | 29.94 | 27.24 | 28.41 |
| **Max** | 157 | 217 | 190 | 217 |
| **Min** | 32 | 33 | 40 | 32 |

*Panel B: By industry group**

| *Industry group code** | *1* | *2* | *3* | *4* | *5* | *6* | *7* |
|---|---|---|---|---|---|---|---|
| **N** | 16 | 114 | 130 | 7 | 41 | 56 | 29 |
| **Mean** | 105.56 | 112.94 | 104.22 | 60.14 | 92.41 | 110.04 | 107.72 |
| **Median** | 103.50 | 115 | 99 | 62 | 83 | 113 | 119 |
| **STDEV** | 33.53 | 24.17 | 26.62 | 32.73 | 28.55 | 28.25 | 32.67 |
| **Max** | 157 | 154 | 190 | 127 | 183 | 217 | 149 |
| **Min** | 55 | 52 | 52 | 32 | 49 | 56 | 53 |

***Industry Group Code**

| | |
|---|---|
| 1 | Financial |
| 2 | Manufacturing |
| 3 | Property and Hotel |
| 4 | Utilities |
| 5 | Transportation and Communication |
| 6 | Wholesale and Retail |
| 7 | Services and Others |

**Table 3**
**Descriptive statistics on independent variables and Spearman rank correlations**

*Panel A: Descriptive statistics by year*

| | *1991* N=126 | | *1992* N=131 | | *1993* N=136 | | *1991-1993* N=393 | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **Mean (Stdev)** | **Median** | **Mean (Stdev)** | **Median** | **Mean (Stdev)** | **Median** | **Mean (Stdev)** | **Median** |
| **FO** | 32.54% | | 31.30% | | 29.41% | | 31.04% | |
| **FC** | −343.374 | −270.691 | −363.236 | −255.784 | −368.727 | −285.546 | −358.768 | −278.919 |
| | (344.810) | | (537.435) | | (320.833) | | (411.420) | |
| **ST** | 32.54% | | 33.59% | | 32.35% | | 32.82% | |
| **SUB** | 3.440 | 2.914 | 3.530 | 3.000 | 3.814 | 3.464 | 3.599 | 3.162 |
| | (2.105) | | (2.070) | | (2.327) | | (2.173) | |
| **IND** | 28.57% | | 31.30% | | 32.35% | | 30.79% | |
| **EI** | 38.89% | | 29.77% | | 8.09% | | 25.19% | |
| **LOSS** | 3.17% | | 5.34% | | 2.21% | | 3.56% | |
| **AO** | 3.17% | | 9.92% | | 26.47% | | 13.49% | |
| **SIZE** | 7.779 | 7.675 | 7.992 | 7.865 | 8.238 | 7.965 | 8.009 | 7.813 |
| | (1.443) | | (1.378) | | (1.382) | | (1.410) | |
| **NEWS** | 56.35% | | 62.60% | | 67.65% | | 62.34% | |

**Definition of variables**

FO =dummy variable percentage shown, 1 if company is family-owned/controlled, otherwise 0
FC =financial condition as defined by Zmijewski's financial condition index
ST =dummy variable percentage shown, 1 if the audit company employs structured audit approach, otherwise 0
SUB =square root of number of subsidiaries
IND =dummy variable percentage shown, 1 if company is classified as industrials, otherwise 0
EI =dummy variable percentage shown, 1 if company reports extraordinary items, otherwise 0
LOSS =dummy variable percentage shown, 1 if company reports loss, otherwise 0
AO =dummy variable percentage shown, 1 if audit opinion is qualified, otherwise 0
SIZE =natural log of total assets
NEWS =dummy variable percentage shown for positive unexpected news, 1 if $(EPS_t - EPS_{t-1})/EPS_{t-1}$ is positive, otherwise 0

**Table 3 (continued)**

*Panel B: Correlations for the total sample*

| | *FO* | *FC* | *SUB* | *IND* | *EI* | *LOSS* | *AO* | *SIZE* | *NEWS* | *ST* |
|---|---|---|---|---|---|---|---|---|---|---|
| **FO** | 1 | 0.05202 | 0.15773** | −0.26880*** | −0.11063* | −0.09928* | −0.10390* | 0.55865*** | 0.16962*** | 0.03460 |
| **FC** | | 1 | −0.02800 | −0.26422*** | −0.01121 | 0.31970*** | −0.03454 | 0.08036 | −0.25228*** | 0.06864 |
| **SUB** | | | 1 | −0.00970 | −0.04530 | 0.00200 | −0.02715 | 0.24418*** | 0.06072 | −0.11343* |
| **IND** | | | | 1 | 0.03199 | 0.07999 | −0.00513 | −0.30455*** | −0.06180 | −0.06712 |
| **EI** | | | | | 1 | 0.14146** | −0.04035 | −0.03425 | −0.09336 | 0.04374 |
| **LOSS** | | | | | | 1 | −0.03569 | −0.23137*** | −0.10562* | 0.12877* |
| **AO** | | | | | | | 1 | −0.04826 | 0.01475 | −0.16494*** |
| **SIZE** | | | | | | | | 1 | 0.20016*** | 0.03735 |
| **NEWS** | | | | | | | | | 1 | 0.00649 |
| **ST** | | | | | | | | | | 1 |

*p< =0.05
**p< =0.01
***p< =0.001

**Definition of variables**

FO =dummy variable, 1 if company is family-owned/controlled, otherwise 0
FC =financial condition as defined by Zmijewski's financial condition index
ST =dummy variable, 1 if the audit company employs structured audit approach, otherwise 0
SUB =square root of number of subsidiaries
IND =dummy variable, 1 if company is classified as industrials, otherwise 0
EI =dummy variable, 1 if company reports extraordinary items, otherwise 0
LOSS =dummy variable, 1 if company reports loss, otherwise 0
AO =dummy variable, 1 if audit opinion is qualified, otherwise 0
SIZE =natural log of total assets
NEWS =dummy variable for positive unexpected news, 1 if $(EPS_t - EPS_{t-1})/EPS_{t-1}$ is positive, otherwise 0

over the three-year period. The percentage number of extraordinary items is drastically reduced in 1993 because a new accounting standard was implemented in Hong Kong, effective that year.[11] The percentage of negative opinions is relatively high for 1993 (mean of 26.47% as compared to the mean of 3.17% and 9.92% for 1991 and 1992 respectively). This is probably due to the gradual increase in the number of smaller companies listed in 1993 as compared to 1991.[12] The number of companies reporting losses has been relatively small for all three years. The mean of positive earnings news for 1991 is 56.35% as compared to 62.60% and 67.65% for 1992 and 1993 respectively, which suggests that 1993 has the highest percentage of positive earnings news. The mean FC for individual years is almost the same as for the total sample. However, the range for the sample is quite wide, i.e. between 3508.23 and −2679.85.

The correlation results as shown in Panel B of Table 3 indicate that family ownership is positively and significantly correlated with company size, number of subsidiaries and positive earnings news. This suggests that family-owned companies are relatively larger, have a larger number of subsidiaries, and have reported positive earnings news. The positive correlation of the company's financial condition with the loss variable suggests that companies in weak financial condition have reported more losses. The positive earnings news variable is negatively and significantly correlated with financial condition, which suggests that financially weak companies do not have positive earnings news. The positive correlation between size and positive earnings news suggests that large companies have comparatively more positive earnings news.

An analysis of association between audit opinion and extraordinary items indicates that out of 84.30% of unqualified opinions, 25.88% of companies disclosed extraordinary items. Only 2.80% of qualified firms related to firms which disclosed extraordinary items. Therefore, extraordinary items did not have any significant impact on ARL.

### *5.2. Regression results*

The regression results on the total sample for 1991–1993 are shown in Table 4.

The F-value (F-value = 7.464, prob. < 0.0001) of Model 1 indicates that the model is robust and the adjusted R-square of 14.16% suggests that the model has reasonable explanatory power.[13] The coefficients of all experimental and control variables with the exception of audit opinion (AO) and loss are in the expected direction. The coefficients for auditor business risk proxied by financial condition of the company (FC), and audit firm technology (ST) are statistically significant. The significant positive coefficient for the company's financial condition indicates that auditors take a comparatively longer time in auditing companies associated with a higher risk index. These results support Hypothesis 1, that a higher auditor business risk proxied by a weak financial condition leads to a longer audit report lag.[14] In order to have a better understanding of the impact of individual components of financial condition, an additional regression test is conducted by including three components of financial risk, i.e., return on assets (ROA), financial leverage (FINL) and liquidity ratio (LIQ) instead of the FC variable. The findings in Model 2 of Table 4 show that the coefficient of ROA is statistically significant, whereas coefficients of the other two components are insignificant. The negative sign of ROA indicates that the lower the ROA, the longer the audit delay. The result thus suggests that ROA is an important component of the financial condition variable for Hong Kong firms.

The results for Models 1 and 2 (Table 4) also show that the coefficient for family ownership (FO) is in the expected negative direction, suggesting that ARL for family-owned and controlled companies is likely to be shorter. The coefficient for this variable is, however, statistically insignificant.[15] Though insignificant coefficients for the FO variable do not fully support Hypothesis 2, the negative coefficients suggest that family-owned and controlled companies are likely to be associated with shorter ARL.

The positive and significant coefficient for the structured audit approach shows that companies audited by audit firms using the structured audit approach have a comparatively longer ARL. This result supports Hypothesis 3. The result is similar to that found in Bamber et al.'s (1993) study, which reported longer delays for US companies audited by firms using the structured audit approach.

The results on the control variables are generally in the expected direction, as suggested in the literature, except for the variables of audit opinion and loss. The results on the audit complexity variable proxied by the number of subsidiaries indicate that the association between the client's number of sub-

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[11] A Chow test was run to test for the differences in EI between the years and the result showed that there is no significant difference.

[12] There is an increase of 120 companies from 1991 to 1993. This is also the first year that H-share companies were listed in Hong Kong.

[13] The model's significance level, as well as the adjusted R-square, are similar to Ng-Tai's (1994) study.

[14] The regression results on individual years also indicate that the coefficients are positive and that they are statistically significant for all the three years.

[15] The results for individual years with the exception of 1991 are also in the expected negative direction, but none of the coefficients are statistically significant.

**Table 4**
**Regressions results on audit report lag (N = 393)**

**Model 1:** $ARL = \alpha + \beta_1 FO + \beta_2 FC + \beta_3 ST + \beta_4 SUB + \beta_5 IND + \beta_6 EI + \beta_7 LOSS + \beta_8 AO + \beta_9 SIZE + \beta_{10} NEWS + e$

**Model 2:** $ARL = \alpha + \beta_1 FO + \beta_2 ST + \beta_3 SUB + \beta_4 IND + \beta_5 EI + \beta_6 LOSS + \beta_7 AO + \beta_8 SIZE + \beta_9 NEWS + \beta_{10} LIQ + \beta_{11} FINL + \beta_{12} ROA + e$

| | | Model 1 | | Model 2 | |
|---|---|---|---|---|---|
| Variable | Expected sign | Coefficient | t-statistic | Coefficient | t-statistic |
| INTERCEPT | | 5.1041 | 51.491*** | 5.1330 | 49.965*** |
| FO | − | −0.0347 | −0.954 | −0.0318 | −0.872 |
| FC | + | 0.0002 | 3.877*** | − | − |
| ST | + | 0.0602 | 2.009* | 0.0631 | 2.080* |
| SUB | + | 0.0116 | 1.729* | 0.0114 | 1.687* |
| IND | + | 0.0193 | 0.604 | 0.0118 | 0.366 |
| EI | + | 0.0309 | 0.963 | 0.0266 | 0.829 |
| LOSS | + | −0.0334 | −0.379 | −0.0300 | −0.340 |
| AO | + | −0.0754 | −1.852* | −0.0747 | −1.834* |
| SIZE | − | −0.0587 | −4.559*** | −0.0625 | −4.799*** |
| NEWS | − | −0.0160 | −0.546 | −0.0179 | −0.609 |
| LIQ | | | | 0.0544 | 0.818 |
| FINL | | | | −0.0075 | −1.480 |
| ROA | | | | −0.6156 | −3.370*** |
| $R^2$ | | 16.35% | | 17.06% | |
| Adjusted $R^2$ | | 14.16% | | 14.44% | |
| F Value | | 7.464*** | | 6.513*** | |
| Prob>F | | 0.0001 | | 0.0001 | |

*Significant at the 0.05 level
***Significant at the 0.001 level

**Definition of variables**

FO = dummy variable, 1 if company is family-owned/controlled, otherwise 0
FC = financial condition as defined by Zmijewski's financial condition index
ST = dummy variable, 1 if the audit company employs structured audit approach, otherwise 0
SUB = square root of number of subsidiaries
IND = dummy variable, 1 if company is classified as industrials, otherwise 0
EI = dummy variable, 1 if company reports extraordinary items, otherwise 0
LOSS = dummy variable, 1 if company reports loss, otherwise 0
AO = dummy variable, 1 if audit opinion is qualified, otherwise 0
SIZE = natural log of total assets
NEWS = dummy variable for positive unexpected news, 1 if $(EPS_t - EPS_{t-1})/EPS_{t-1}$ is positive, otherwise 0
LIQ = ratio of current assets to current liabilities
FINL = ratio of total debt to total assets
ROA = ratio of net income to total assets

sidiaries (SUB) and ARL is significant and in the expected positive direction. The results on the other audit complexity variable, proxied by the client's primary industry, show that industrial companies are positively associated with audit delays, indicating that industrial companies have generally longer audit delays.[15]

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[16] Regression for other industry dummies such as manufacturing, property and hotel, wholesale and retail are run and the

The result on the variable of extraordinary items (EI) of the 'other work-related' factors is in the expected direction but statistically not significant. The results on audit opinion (AO) and loss (LOSS) variables of the 'other work-related' factors are neither in the expected direction nor statistically significant. These findings on audit opinion, contrary to those of earlier studies, suggest that client companies receiving qualified audit opinions are not likely to have longer audit delays. This could be due to a relatively small number of companies with qualified audit opinions in the sample. Another possible explanation for the negative coefficient could be that additional audit work is not considered essential when the evidence for a qualified opinion is overwhelming, and this situation results in relatively shorter audit delays for such companies.

The results on the company size variable (SIZE), used as a proxy for incentives for a timely audit report, are in the expected direction. The negative coefficient for size is statistically significant, suggesting that larger companies are associated with shorter audit delays. The coefficient for the unexpected positive news is in the predicted direction but not statistically significant.

Since the results of some earlier studies have indicated that the auditor switch might have an impact on audit delays, we also conducted a regression test by including the variable of 'auditor switch' as the control variable. The result indicates that the coefficient for auditor switch is insignificant, and inclusion of this variable in the analysis does not change the results of the other variables.

The variance inflation factor (VIF) has been less than two for each variable, which suggests that the multicollinearity problem is not severe (e.g., Lardaro, 1993). The results on the General White test show that there is also no significant heteroskedasticity problem.

## 6. Discussion of results and conclusion

The findings of this study support the expectation that ARL of Hong Kong companies is a function of auditor business risk and audit firm technology. Auditors are likely to conduct extensive audit procedures on a company with weak financial condition and this will delay their audit report. This evidence is consistent with the results for US companies (Bamber et al., 1993). The negative association between family ownership and control and ARL suggests that family ownership and control of Hong Kong companies may reduce audit delays. But the results are statistically not significant. The statistically weak results could have been due to the dichotomous classification of family ownership/control. Future research studies could develop alternative procedures to identify the percentage of family ownership in the companies.

The findings on the structured audit approach show that Hong Kong companies audited by audit firms using the structured audit approach are likely to take a comparatively longer audit time. This evidence implies that longer delays for the structured audit approach would translate into more resources going into the audit work. It would be interesting to examine whether structured audits would result in some benefits such as lower risk, more evidence to support the audit work and/or lower litigation costs, which would justify allocation of additional resources for detailed audit work.[17]

The results on the association between ARL and company size, used as a proxy for incentives for a timely audit report, show that large companies are expected to have shorter audit delays. The results of this study do not support the findings of earlier studies that qualified audit opinions and companies reporting losses will have longer audit delays.

The results of this study need to be interpreted with caution because of its limitations. First, ARL used in this study reflects the audit work from the year-end to the audit report date. Audit work conducted outside this period has not been considered in the analysis. Second, audit report lag is measured in terms of days rather than man-hours spent on audit work. This could create a measurement problem if audit firms spend more than a normal day's work on the audit. Third, there could be other factors, such as administrative approval process with the home office, which affects ARL and have not been included in the model.

In conclusion, this study provides evidence to show that the audit report lag for Hong Kong companies is affected by auditor business risk and audit firm technology. Specifically, financially weak companies would have longer audit delays than companies with strong financial condition. There is also some indication that family-owned and controlled companies would result in shorter ARL, though the results are statistically not significant. The results of this study provide useful information for international investors.

## References

Arens, A. and Loebbecke, J. (1991). *Auditing: An Integrated Approach*. Fifth Edition. Englewood Cliffs, NJ: Prentice-Hall.

Ashton, R., Willingham, J. and Elliott, R. (1987). 'An empirical analysis of audit delay'. *Journal of Accounting Research* (Autumn): 275–292.

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results are similar. The regression results on utilities, however, indicate that audit delays are shorter.

[17] The systematic descriptive power corroborates the interview evidence of a world audit approach, as represented by the Big Five.

Ashton, R., Graul, P. and Newton, J. (1989). 'Audit delay and the timeliness of corporate reporting'. *Contemporary Accounting Research* (Spring): 657–673.

Bamber, E., Bamber, L. and Schoderbeck, M. (1993). 'Audit structure and other determinants of audit report lag'. *Auditing: A Journal of Practice and Theory*, 12 (Spring): 1–23.

Carslaw, A. and Kaplan, S. (1991). 'An examination of audit delay: further evidence from New Zealand'. *Accounting and Business Research*, 22: 21–32.

Courtis, J. (1976). 'Relationships between timeliness in corporate reporting and corporate attributes'. *Accounting and Business Research* (Winter): 45–56.

Davis, B. and Whittred, G. (1980). 'The association between selected corporate reporting and timeliness in corporate reporting: further analysis'. *Abacus* (June): 48–60.

Dirsmith, M. and Haskins, M. (1991). 'Inherent risk assessment and audit firm technology: a contrast in world theories'. *Accounting, Organisations and Society* (January): 61–90.

Dopuch, N., Holthausen, R. and Leftwich, R. (1986). 'Abnormal risk stock returns associated with media disclosures of "subject to" qualified audit opinions'. *Journal of Accounting and Economics* (June): 93–118.

Financial Accounting Standards Board (1980). *Statement of Financial Accounting Concepts No. 2, Qualitative Characteristics of Accounting Information*. Standford, CT: FASB.

Field, L. and Wilkins, M. (1991). 'The information content of withdrawn audit qualifications: new evidence on the value of "subject to" opinions'. *Auditing: A Journal of Practice and Theory* (Fall): 62–69.

Garsombke, H. (1981). 'The timeliness of corporate financial disclosures?' In *Communication via Annual Report*. AFM Explanatory Series? No. 11: 204–218.

Jensen, M. C. and Meckling, W. H. (1976). 'Theory of the firm: managerial behavior, agency costs, and ownership structure'. *Journal of Financial Economics* (October): 305–360.

Kinney Jr., W. and McDaniel L. (1989). 'Characteristics of firms correcting previously reported quarterly earnings'. *Journal of Accounting and Economics* (February): 71–93.

Kleinbaum, D. (1978). *Applied Regression Analysis and Other Multivariable Methods*. Belmont, California: Wadsworth Publishing Co. Inc.

Lardaro, L. (1993). *Applied Econometrics*. Harper Collins.

Lau, P. (1997). 'Analysis of the effects of risk, materiality and structure on auditors' evidential planning decisions'. Working paper, Baptist University of Hong Kong.

Loudder, M., Khurana, I., Sawyers, R., Cordery, C., Johnson, C., Lowe, J. and Wunderele, R. (1992). 'The information content of audit qualifications'. *Auditing: A Journal of Practice and Theory* (Spring): 69–82.

Maddala, G. (1977). *Econometrics*. McGraw Hill, Inc.

Mok, H., Lam, K. and Cheung, I. (1992). 'Family control and return covariation in Hong Kong's common stocks'. *Journal of Business Finance and Accounting* (January): 277–293.

Mullarkey, J. (1984). 'The case of the unstructured audit approach'. In *Auditing Symposium VII: Proceedings of the 1982 Touche Ross/University of Kansas Symposium on Audit Problems*.

Newton, J. and Ashton, R. (1989). 'The association between audit technology and audit delay'. *Auditing: A Journal of Practice and Theory* (Supplement): 22–37.

Ng, P. H. and Tai, Y. K. (1994). 'An empirical examination of the determinants of audit delay in Hong Kong'. *British Accounting Review*, 26: 43–59.

Palmrose, Z. (1987). 'Litigation and independent auditors: the role of business failures and management fraud'. *Auditing: A Journal of Practice and Theory*, 6: 90–103.

Pratt, J. and Stice, J. (1994). 'The effects of client characteristics or auditor litigation risk judgments, required audit evidence and recommended audit fees'. *Accounting Review* (October): 639–656.

Sullivan, D. (1994). 'The case of the unstructured audit approach'. In Auditing *Symposium VII. op. cit.*

Whittred, G. (1980). 'Audit qualification and the timeliness of client earnings announcements'. *Accounting Review* (October): 563–577.

Zmijewski, M. (1984). 'Methodological issues related to the estimation of financial distress prediction models'. *Journal of Accounting Research* (Supplement): 59–82.

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# Financial covenants and related contracting processes in the Australian private debt market: an experimental study

**Paul Mather***

**Abstract**—Private debt markets are characterised by covenant-restrictive but renegotiation-flexible debt contracts as financial intermediaries lending in private debt markets have a comparative advantage over investors in public debt markets in offering such contracts. The two research questions investigated in this paper are 'Whether several borrower- and contract-specific variables determine the restrictiveness of financial covenants in private debt contracts?' and 'Whether several borrower- and contract-specific variables are associated with loan officers' decisions to waive technical default on financial covenants?' Two behavioural experiments involving loan officers examined these contracting processes in the Australian private debt market. The first experiment examined whether certain variables determine the restrictiveness of financial covenants in private debt contracts. Management reputation and security were found to be associated with the number and tightness of financial covenants, while high financial risk was associated with increased tightness, but not the number, of such covenants. The effect of the interaction management reputation × security, was also significant. The second experiment examined the association between certain variables and the likelihood of loan officers waiving technical default on financial covenants. Low financial risk, security and defaults caused solely by a change in accounting standards were found to be associated with the likelihood of the default being waived.

## 1. Introduction

It has been theorised that contracting has a role in alleviating potential conflicts of interest between debtholders and shareholders. In particular, Smith and Warner (1979) put forward the costly contracting hypothesis suggesting that control of the debtholder-shareholder conflict through financial contracts can increase the value of the firm. The use of covenants in debt contracting is an integral part of controlling these conflicts.

Financial intermediaries lending in private debt markets have a comparative advantage over individual investors (who typically lend in public debt markets), or their agents, in sourcing information about borrower risk and in facilitating initial and subsequent negotiation. It is therefore logical that they should offer debt contracts with specifically tailored covenants and renegotiation options (Berlin and Mester, 1992). Such covenant-restrictive but renegotiation-flexible contracts are not well suited to public debt markets that are characterised by diverse and numerous investors. There is some empirical support for this proposition. For example, private debt contracts tend to have more restrictive covenants than public debt contracts and these covenants are less homogenous than those found in public debt contracts (Mather, 1999:66).

Incentives to maintain a reputation for reasonableness in renegotiation may also give lenders in private debt markets another advantage over individual investors in offering contracts that facilitate renegotiation. A lender may have more incentive to consider granting a covenant waiver than an individual investor.[1] This is because an investor in a public debt market, who does not expect to make regular loans in the future, may perceive that there is little to gain from granting a waiver. However, a lender who regularly makes

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[1] While a trustee acts on behalf of the individual investors, individual investors have to approve any course of action ensuing from a technical breach.

loans in private debt markets may profit from a reputation for being flexible in a constructive manner (Sharpe, 1990).[2]

The Australian private debt market is significantly larger than the public debt market in terms of both volume and value (Foster and Stewart, 1991). Analysing the borrowings of a sample of Australian firms in 1995, Cotter (1998:183) shows that public debt only accounted for 4.5% of total borrowings as opposed to unsecured and secured bank loans which accounted for 40.9% and 13.3% of total borrowings, respectively. However, little is known about the contracting processes associated with determining restrictive covenants in this debt market and renegotiation in the event of technical default.[3]

These contracting processes are important. A greater understanding of what determines the restrictiveness of covenants in debt contracts would serve to extend the contribution of agency theory to the capital structure debate and to enhance the development of the costly contracting hypothesis.[4] Accordingly, the first research question investigated in this paper is: 'Whether several borrower- and contract-specific variables determine the restrictiveness of financial covenants[5] in private debt contracts?'

Additionally, there is a body of literature suggesting that firms adopt income-increasing accounting policies in the years preceding technical default on financial covenants (Beneish and Press, 1993).[6] Underlying this literature is the assumption that technical default on covenants is costly. However, there is no reported research into technical default on covenants in Australian public or private debt contracts. Unlike the US, there is very little publicly available information about technical default. Publicly available information in respect of private debt contracts is particularly scarce. Hence, the second research question investigated is: 'Whether several borrower- and contract-specific variables are associated with loan officers' decisions to waive technical default on financial covenants?'

These are the first behavioural experiments examining these debt contracting processes reported in the literature, and the paper contributes in several ways. First, the methodology allows comparisons with findings of prior research from a new perspective. Second, the methodology enabled the investigation of the effect of management reputation on the restrictiveness of covenants: an important addition to the literature given its prominence in professional banking writings. Third, the experimental setting facilitated controlling the investment opportunity set when studying the responses to technical default, thereby overcoming a limitation of the main prior study in this area (Chen and Wei, 1993).

The remainder of the paper is structured as follows. Section 2 reviews prior research and provides further motivation for the study. Sections 3 and 4 develop several hypotheses and discuss the research method used to test these hypotheses. The results of the behavioural experiments are analysed in Section 5 and the final section draws conclusions and discusses limitations.

## 2. Prior research

### *2.1. Determinants of financial covenants*

The literature examining borrower and/or contract-specific characteristics associated with covenants in debt contracts generally shows that contractual provisions in debt contracts are not randomly distributed, but are related to the likelihood of debtholder-shareholder conflict. There are, however, some conflicting findings.

Most studies report a positive association between the restrictiveness of financial covenants and leverage (for example, Malitz, 1986; El-Gazzar and Pastena, 1991 in the US and Citron, 1992 in the UK). However, Citron (1995), in his study of UK public debt contracts, found that once he controlled for the level of assets-in-place, there was no significant relationship between the presence of financial covenants and leverage. Similarly, El-Gazzar and Pastena (1991) found that secured loans were associated with less restrictive covenants while the results of Citron (1992) were inconclusive. On the other hand, Citron (1995) found that the relationship between financial covenants and security depended on the nature of the security.

Additionally, apart from a survey (Citron, 1992) and interviews (Day and Taylor, 1995, 1996 and 1998) of UK loan officers, there has been no behavioural research in the area. A behavioural experiment facilitates the study of certain qualitative characteristics that are difficult to examine in the more conventional archival research into the debt contracts. Accordingly, it was decided to examine leverage, security and the qualitative variable, management reputation, in this study.

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[2] Sharpe (1990) developed a model in which financial intermediaries trade off the value of expropriating monopoly rents in the short-run for the value of future relationships made possible by a good reputation.

[3] 'Technical default', is the failure to comply with covenants in debt contracts and is differentiated from 'Debt service default', which is the failure to make loan repayments.

[4] For a discussion of the contribution of agency theory to the capital structure debate, see Myers (1977) and Barnea, Haugen and Senbet (1985).

[5] Financial covenants are defined as those covenants that use accounting data in their formulation either as an absolute amount or as the numerator and/or denominator of a ratio.

[6] Although some of the more recent evidence is more ambiguous (see DeAngelo, DeAngelo and Skinner, 1994; DeFond and Jiambalvo, 1994).

There were two other factors that motivated the research into the determinants of financial covenants. First, apart from Cotter (1998), there has been no research into the determinants of covenants in the Australian private debt market. Cotter's research was based on a relatively small sample (9 interviews and extracts of 23 bank loan contracts). Accordingly, the associations she noted (firm size and industry) were not statistically tested.

Second, the restrictiveness of a covenant package is a function of both the number of covenants and how 'tight' (the extent of slack around a covenant) they are. The prior research either measured restrictiveness as a function of the number of covenants in a contract or, with the exception of El-Gazzar and Pastena (1991), was based on the limit of the covenant without regard to covenant slack. For example, a maximum debt/equity ratio of 50% was considered more restrictive than a maximum ratio of 70% without regard to the borrower's actual debt/equity ratio. Accordingly, it was decided to examine both the number and the tightness of such covenants.

### 2.2. *Decision to waive technical default*

In the case of technical default, a range of options is available to lenders. These may include calling the loan, foreclosing on security, renegotiating terms or waiving the default. Clearly, these options are not necessarily mutually exclusive and the cost to the borrower varies considerably. The lender's decision to waive or not waive appears to be particularly critical to the borrower's ensuing costs (Beneish and Press, 1993).

Covenants serve to limit a borrower's flexibility in future decision making (Smith and Warner, 1979; Berlin and Mester, 1992). To the extent that they prevent the borrower from taking efficient actions, they may have a detrimental effect on firm value. However, the implicit or explicit provision for covenant renegotiation may alleviate this restriction on flexibility. For example, if a planned project would violate a covenant in an existing debt contract, the borrower may request that the covenant be waived. The lender, having evaluated the planned project, may agree to waive or modify the covenant. Even if the proposed project increases the risk of the loan (for example, by increasing overall business risk), the lender may be willing to grant a waiver in return for other modifications to the debt contract. Accordingly, covenants may be viewed as a mechanism for triggering re-evaluation of borrower risk, principally in the context of potential, or actual, technical default.

There is no reported research into technical default on Australian public or private debt contracts. A major empirical study in this area by Chen and Wei (1993), who examined 128 US firms in technical default, found that lenders were more likely to grant a waiver to a firm with lower estimated probability of bankruptcy and a lower leverage ratio. Additionally, loans that were secured or were smaller in size were more likely to have technical defaults waived than unsecured or larger loans.[7]

Smith (1993) pointed out that Chen and Wei examined leverage without considering the firms' investment opportunity set. Such an approach is valid only if all the firms in the sample are homogenous. In reality, lenders are likely to assess 'high' or 'low' leverage in the context of what they consider to be optimal, given each firm's specific circumstances, especially the firm's investment opportunity set ('IOS'). The asset structure of the firm (tangible versus intangible assets) and industry usually act as proxies for the IOS. The present study was designed to control for asset structure and industry.

Two other studies involved surveys examining lenders' decisions to waive events of technical default (Citron, 1992 and Gopalakrishnan and Parkash, 1995). Citron surveyed 33 UK loan officers who stated that 'high cost' penalties, such as loan acceleration, were usually adopted where no prior warning of the breach had been received. Breaches caused by the adoption of new (or changes to) accounting standards appeared to impose few real costs on borrowers. This finding was also supported by a survey of US loan officers by Gopalakrishnan and Parkash (1995). Such behavioural research facilitates the study of certain characteristics, such as the reason for the default, which are difficult to examine in archival research into technical default. Accordingly, it was decided to undertake a behavioural experiment to examine lenders' decisions to waive technical default on private debt contracts.

## 3. Hypothesis development

### 3.1. *Determinants of financial covenants*

The first set of hypotheses relates to the loan officers' *ex-ante* choice of financial covenants to be used in bank loan contracts.

#### 3.1.1. *Financial risk*

High financial risk increases the volatility of the borrowing firms' returns and the likelihood of financial distress. Moreover, it has been shown that the greater the volatility of the borrowing firms' returns and/or the closer they are to financial distress, the greater the incentive and opportunities for borrowers to engage in post-contractual opportunism (Barnea et al., 1985). Covenants play a role in reducing such post-contractual opportunism on the part of borrowers (Smith and Warner, 1979). Notwithstanding Citron (1995), it follows that the contracts of borrowers with high financial risk are likely to be associated with a greater number and a tighter set of financial covenants, even if their asset structures are similar to borrowers with low financial risk.

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[7] There are many institutional differences between US and Australian debt markets. In particular the focus of US insolvency law, for example chapter 11 proceedings, is on debtor protection (Franks and Torous, 1989), whilst in Australia the focus is on the protection of creditors (section 439 of the Corporations Law).

As a result, the following hypothesis is proposed:

**Hypothesis 1:** Loan officers will utilise a more restrictive set of financial covenants in the bank loan contract of a borrower with relatively high financial risk.

### *3.1.2. Management reputation*

There is no empirical evidence to suggest that management reputation[8] influences financial covenants in bank (or other) loan contracts. However, the professional banking literature identifies management reputation as a key factor in credit analysis (for example, Altman, 1985). Similarly, the academic literature provides evidence that lenders' assessments of management reputation have an effect on lenders' assessments of ability to repay (for example, see Danos, Holt and Imhoff, 1989). Accordingly, as one of the functions of covenants in debt contracts is to provide a signal of impending difficulties, it follows that the need for covenants is greater where management reputation is unknown. It is also argued that management reputation is likely to be a determinant of financial covenants because of incentives for managers to preserve their reputation in labour and debt markets.

Managers rent their human capital to the firm and the rental rates for their human capital are signalled, if not largely determined, by the managerial labour market. Fama (1980) contends that information on managers'opportunistic behaviour (in their dealings with shareholders) becomes known and affects their reputation in the managerial labour market. The labour market revises the future remuneration of these managers downwards, thus reducing the value of their human capital. Accordingly, Fama argued that the managerial labour market and the incentives for managers to protect their reputation may partially counteract agency problems.

Fama's hypothesis may be extended to support a view that the incentives for managers to protect their reputation extend to their dealings with lenders. First, information on opportunistic behaviour in managers' dealings with lenders could also affect their reputation in the labour market. Second, a loss of reputation in debt markets will adversely affect their ability to raise finance in the future, thereby having a negative impact on their performance which, in turn, will reduce the value of their human capital. Lenders will be aware of these incentives and place some weight on management reputation when negotiating contract details.

Accordingly, the following hypothesis is proposed:

**Hypothesis 2:** Loan officers will utilise a more restrictive set of financial covenants in the bank loan contract of a borrower whose management team has an unknown reputation than in the bank loan contract of a borrower whose management team has a positive reputation.

### *3.1.3. Security*

When loans are secured, the potential for conflicts between secured lenders and shareholders are reduced as lenders' claims over specific assets limit the scope for asset substitution and claim dilution. Accordingly, the need for certain financial covenants (for example, a maximum debt ratio) designed to address claim dilution and, to some degree, asset substitution, diminishes when loans are secured.

Stulz and Johnson (1985) also show that financing new projects with secured debt provides more incentives for borrowers to undertake projects with a positive net present value, thereby providing a helpful mechanism to mitigate the underinvestment problem. Once again, this would appear to reduce the need for certain financial covenants, such as a maximum debt ratio, minimum net worth and/or interest cover, which may be used indirectly to control underinvestment.

Accordingly, the following hypothesis is proposed:

**Hypothesis 3:** Loan officers will utilise a more restrictive set of financial covenants in the bank loan contract of an unsecured loan rather than the contract of a secured loan.

### *3.2. The waiver decision*

The second set of hypotheses relates to loan officers' decisions to waive the technical default on financial covenants in bank loan contracts and, in particular, borrower-specific or contract-specific characteristics which may influence this decision.

A potential or actual technical default would result in lenders re-evaluating borrower risk with a view to exercising one or more of the options available to protect their position. Even where a technical default is caused by circumstances that increase borrower risk (for example, a deterioration in operating performance), lenders have a trade-off to make. In the first instance they would wish to protect their position against further deterioration. However, they would also need to consider the costs associated with any action on their part. Such costs could include the possible loss of a client (where the action is taken is severe, for example, calling the loan) as well as the loss of reputation for reasonableness in debt markets. This reputation for reasonableness is of particular importance to lenders in private as opposed to public debt markets. As such, it is argued that, in the event of technical default, lenders in a private debt market will not necessarily exercise one or more of the options available to protect their position.

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[8] Management reputation was considered to be a single variable encompassing competence and integrity. A focus group of senior loan officers suggested that, for the purposes of any form of credit analysis, an assessment of a borrowing firm's management team needs to encompass both these attributes.

### *3.2.1. Financial risk*

As in the case of the *ex ante* decision as to the restrictiveness of financial covenants, lenders are likely to consider the level of financial risk of the borrower when re-evaluating the relationship and determining whether to waive a technical default. Since high financial risk increases the volatility of the borrowing firms' returns and the likelihood of financial distress, rational lenders are likely to understand the incentives for borrowers to engage in post-contractual opportunism, and the increased likelihood of debt service default. Accordingly, they are likely to exercise one of the options open to them to protect their position rather than waive the technical default.

As a result, the following hypothesis is proposed:

**Hypothesis 4:** Loan officers are more likely to waive the technical default on a financial covenant by a borrower with a relatively low financial risk.

### *3.2.2. Reason for technical default*

The accounting information to be used when calculating financial covenants may be prepared on the basis of 'rolling' or 'frozen' GAAP and/or some variation thereof. An analysis of accounting measurement rules in the Australian public debt market (Whittred and Zimmer, 1986:30) and in the Australian bank loan market (Mather, 1999:67) indicates a heavy reliance on 'rolling' GAAP.

The advantage of debt contracts specifying the use of 'rolling GAAP' is that it eliminates the need to recalculate accounting numbers and prepare special financial reports (that would otherwise be required if contracts specified the use of 'frozen' GAAP) for the purposes of monitoring compliance with financial covenants. However, a cost associated with the use of 'rolling GAAP' is that changes to accounting standards may cause technical default.[9]

Under normal circumstances, a potential or actual technical default would result in lenders re-evaluating borrower risk with a view to exercising one or more of the options available to protect their position. However, if the technical default is caused solely by changes to an accounting standard, it would be expected that lenders would waive the default, as there is no change in borrower risk.

As a result, the following hypothesis is proposed:

**Hypothesis 5:** Loan officers are more likely to waive the technical default on a financial covenant where such a default is caused by a change in an accounting standard as opposed to a deterioration in the borrower's financial position.

### *3.2.3. Security*

As in the case of the *ex ante* decision on the use of covenants, lenders are likely to consider whether the loan is secured when re-evaluating the relationship and determining whether to waive a technical default. As discussed in section 3.1.3, when loans are secured the potential for conflicts between secured lenders and shareholders are reduced as lenders' claims over specific assets limit the scope for asset substitution, claim dilution and underinvestment. If a debt is secured, rational lenders are likely to foresee the reduced incentives for borrowers to engage in post-contractual opportunism. Accordingly, lenders are more likely to waive the technical default than to exercise one of the options open to them to protect their position.

The professional banking literature identifies security as a secondary source of cash inflow in the event of default (Altman, 1985). The lenders' debt recovery process is also more efficient (in terms of both speed and costs) as lenders have established title to the assets securing the loan. It follows that lenders are likely to be influenced by the presence of security when considering their response to technical default.

Accordingly, the following hypothesis is proposed:

**Hypothesis 6:** Loan officers are more likely to waive the technical default on a financial covenant where the loan is secured.

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[9] The introduction of a new standard may also cause technical default.

## 4. Methodology

A mixed factorial design was used in both the experiments. Prior studies of loan officers' behaviour have used such mixed designs (see, for example, Danos et al., 1989; Sami and Schwartz, 1992).

### *4.1. Subjects*

Forty-eight loan officers from 19 Australian and foreign trading banks (or separate divisions of such banks) based in Melbourne and Sydney participated in the study.[10] The subjects were required to have at least two or more years corporate or (larger) business lending experience including in the initiation of loan contracts and dealing with technical default. Additionally, they were required to have some recent experience in managing term loans in the region of $1,500,000.[11] Loan officers working in retail and small business banking were excluded from the sample.[12]

The subjects had, on average, 12.98 years lending experience with a range of two to 28 years. In addition, the vast majority of the subjects had tertiary qualifications, with 55% having a first degree as their highest qualification and 35% having a postgraduate qualification, such as an MBA.

The discretion that loan officers had to tailor loan contracts, including the specification of financial covenants, was of fundamental importance to the feasibility of conducting experiment I. Hence, information was also obtained on loan officers' discretion to specify financial covenants. Although 65% of the subjects had access to some sort of a standard loan contract, they were permitted to use their own judgement to tailor such a standard loan contract to suit the specifics of each case. Loan officers specifically confirmed that this discretion extended to decisions about the imposition of financial covenants.[13] The remainder of the subjects (35%) did not use a standard loan contract.

All subjects were selected by the Chief Credit Officer (or designate) of the bank concerned. In cases where one subject was provided by a bank, the subject was randomly assigned to one of the two treatment groups. A similar process was followed where multiple subjects were provided by a bank. However, a few reallocations were made to ensure that the subjects from such banks were evenly (or as near as possible in the case of an odd number) allocated to each treatment group.[14] Not more than one such reallocation per bank was necessary. The experiments were conducted between 1 January and 30 April 1996. The subjects completed the tasks, in the presence of the researcher, at their respective banks.

### *4.2. Research instruments*

The research instruments comprised the various cases which included background information describing the borrowing company, the industry, markets, products and ownership. In experiment I details of the new loan (which had already been approved) were also outlined. In experiment II, the original loan details and some information about debt servicing were also provided. The borrowers in both experiments were said to be in the retail industry.[15] A summary of the information contained in the instruments is set out in Appendix I.

The hypothetical financial statements were constructed using several sets of the financial statements of private companies engaged in activities similar to those of the entities portrayed in the case material. The profile and financial ratios of the median listed Australian retail firm reported in the 1995 edition of the *Stock Exchange Financial and Profitability Study* were also used as a guide.

The preliminary research instruments were reviewed by several colleagues, a senior lending officer and a senior manager at a 'big six' accounting firm. The latter was a retail industry specialist. The instruments were then pilot tested on four senior loan officers at two of the four major banks.

### *4.3. Dependent variables*

In the experiment relating to the determinants of covenants (experiment I), the subjects were asked to determine the number of financial covenants they would include in the loan contract that was being drawn up by the bank. They were asked to choose from a scale ranging from none to six or more. Subjects were also required to assess how tight the financial covenants imposed in the loan contract were likely to be using a 7-point Likert scale ranging from 1 (very restrictive/tight) to 7 (not at all restrictive/tight).[16]

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[10] The four major Australian banks (two separate divisions in each bank) provided 30 subjects. Four smaller trading banks (six subjects) and seven foreign trading banks (12 subjects) provided the remainder. This sample, whilst non-random, is considered reasonably representative and reflects the four major banks' dominance of the Australian private debt market.

[11] The task in both experiments involved term loans of $1.5m.

[12] Preliminary (pre-pilot) discussions with several senior loan officers indicated that the absence of audited financial statements and relatively unsophisticated borrowers precluded the meaningful use of financial covenants in the retail and small business banking areas.

[13] Prior to the research being undertaken, senior loan officers from each of the four major Australian banks indicated that the standard contracts did not include information about financial covenants.

[14] The purpose of random assignment is to ensure that other subject variables are distributed evenly across treatment groups. Behaviour influenced by institutional culture or attitudes was the one known variable which may potentially have had a confounding effect on the results. Hence the attempt to allocate multiple subjects from the same institution equally between the two treatment groups.

[15] The industry was considered to be 'non-specialist' and an industry with which most Melbourne and Sydney loan officers were likely to be familiar.

In the experiment relating to waiver decisions (experiment II), the subjects were asked to assess the likelihood that they would waive the impending breach of a financial covenant outlined in the case material.[17] A 7-point Likert scale was used ranging from 1 (waive) to 7 (not waive).

A waiver of such a breach could be unconditional or temporary. Accordingly, subjects who were more likely to waive the breach—that is, they circled 1, 2 or 3 on the rating scale—were also asked to indicate whether the waiver was likely to be unconditional or temporary. Once again a 7-point Likert scale was used ranging from 1 (waive unconditionally) to 7 (waive temporarily).

### *4.4. Independent variables*

The borrower- and contract-specific characteristics manipulated as factors in both experiments were financial risk and security. Additionally, management reputation and the reason for the technical default were factors in experiments I and II, respectively. The three factors in each experiment were manipulated in a $2 \times (2 \times 2) = 8$ case fully crossed factorial design.

### *4.5. Between-subjects factor*

Financial risk (leverage) was analysed between-subjects in experiments I and II. Analysing this factor between subjects halved the number of cases that the subjects had to process. Subject variables (for example, personal differences and biases) are not controlled in a between-subjects design.[18] This meant that the leverage factor was given the greatest possible chance of being insignificant in both experiments.

### *4.6. Within-subjects factors*

All other factors were analysed within-subjects in both experiments resulting in an 'efficient' use of subjects.

However, there are potential problems associated with a within-subjects design. A primary concern is that the sequential appearance of the treatments may induce demand effects (Greenwald, 1976; Harsha and Knapp, 1990).

Prior research suggests that a necessary condition for a demand effect to occur is the subject's willingness to cooperate with the researcher so that the experimental data support the latter's hypotheses (Harsha and Knapp, 1990). As the subjects were senior loan officers, with strong personal views on most technical issues, this was considered to be less likely to occur than, say, in an experiment involving students. Nevertheless, several measures were taken to alleviate this potential problem.

First, a camouflaging strategy suggested by Greenwald (1976) was used. Two extraneous variables (accounting policy changes with no cash flow implications) were also systematically manipulated in both experiments in an attempt to draw some attention away from the treatment variables.

Second, during the initial oral introduction to the experiments, subjects were advised that:

> 'The specific questions to be dealt with are at the end of each of the cases. There are no "right" or "wrong" answers to the questions asked. I am simply seeking to elicit what you are likely to propose in each case.'

Similar statements have been made in prior experimental studies in an effort to avoid demand effects (for example, Pany and Reckers, 1980).

The potential for order effects and practice effects was also recognised (Greenwald, 1976; Keppel, 1991). Accordingly, partial counterbalancing procedures were used in the following manner.[19] First, the order in which the two experiments were presented to the subjects was rotated. Second, the order in which the cases were presented was randomised.

### *4.7. Factor levels*

#### *4.7.1. Financial risk—experiments I and II*

Two levels of the financial risk factor were used. They were low and high leverage representing favourable and unfavourable levels, respectively.

Low and high leverage was determined relative to the median debt/equity ratio for listed firms in the retail industry as reported in the 1995 edition of the *Stock Exchange Financial and Profitability Study*. The debt/equity ratios of the firms with 'low' financial risk are approximately 38% of the industry median (50.7%) as opposed to the debt/equity ratios of the firms with the 'higher' financial risk, which approximate to 142% of the industry median. Several senior loan officers were able to satisfactorily discriminate between the levels of financial risk during the pre-pilot and pilot stages of the study.

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[16] The subjects were advised that the restrictiveness of covenants should be taken to mean absence of slack or how 'tight' they are. It is accepted that the restrictiveness of a covenant package is a function of both the number of covenants and how tight they are but, at the pre-pilot stage, senior loan officers expressed a preference for the term restrictive to capture the absence or presence of slack around a covenant.

[17] The subjects were advised that not waiving meant imposing sanctions on the borrower, such as increasing the interest rate, increasing or seeking collateral, imposing further covenants or seeking an acceleration of loan repayments.

[18] Unlike a within-subjects design where subjects act as their own controls in the comparison among treatment effects.

[19] Complete counterbalancing is an arrangement in which all possible sequences of treatment conditions and every sequence is administered the same number of times, thereby neutralising any order or practice effects (Keppel, 1991).

### *4.7.2. Security—experiments I and II*

Two levels of the security factor were used. The favourable level indicated that the security for the loan was a first mortgage over (general purpose) real estate. The lenders' exposure was set at less than 65% of the current value of the property, as several senior leaders indicated that an exposure in excess of 65% of current valuation would not be considered to be a fully secured position. The unfavourable level simply stated that the loan was unsecured.[20]

### *4.7.3. Management reputation—experiment I*

Two levels of the management reputation factor were used. The favourable level indicated that the management team had a positive reputation for competence and integrity in the private debt market and had a good track record of managing loan facilities. The unfavourable level depicted the management as a team whose reputation in the private debt market was unknown.[21]

### *4.7.4. Reason for technical default—experiment II*

Two levels of the factor were used. The favourable level was portrayed as an impending breach of a financial covenant, requiring the borrower to maintain a minimum current ratio, caused purely by a change in an accounting standard.[22]

The unfavourable level was portrayed as an actual deterioration in operating performance due to the loss of a major customer which resulted in the discontinuation of a major product line and a large inventory write-down. Once again, the covenant being breached was a minimum current ratio.

## 5. Results

### *5.1. Statistical techniques and tests of assumptions*

The analysis of variance (ANOVA) technique was used to analyse and test the data. The use of ANOVA is also consistent with prior experiments using factorial designs in a bank lending context (Danos et al., 1989; Sami and Schwartz, 1992).

As Table 1 indicates, all means for the factors in both experiments were in the hypothesised direction.

Notwithstanding the fact that the model, especially with a balanced design, is considered to be robust to violations of the assumptions of normality and homogeneity of variance, the validity of these assumptions were examined. A review of the 'Normal Q-Q plots' for the data gathered in both experiments indicated that the data are normally distributed. Homogeneity of variance was tested using the Cochran C and Bartlett-Box F tests. These test statistics were not significant ($p > 0.05$).[23]

### *5.2. Main effects-determinants of financial growth*

The overall ANOVA summaries are presented in Table 2 (number of covenants) and Table 3 (tightness).

### *5.2.1. Financial risk*

Hypothesis 1 proposed that loan officers will utilise a more restrictive set of financial covenants in the bank loan contract of a borrower with relatively high financial risk. Tables 2 and 3 show mixed results. The difference in the number of covenants was not significant ($p = 0.860$), while the assessment of how tight such covenants would be was significant ($p = 0.021$). This suggests that many loan officers respond to an increased potential for post-contractual opportunism on the part of borrowers with high financial risk by imposing tighter, rather than a greater number of, financial covenants.

Many of the financial covenants commonly used to address some of the problems directly associated with high financial risk, such as claim dilution, are interrelated. For example, a maximum debt ratio and a requirement to maintain a minimum level of net tangible assets use similar accounting numbers and achieve similar objectives. Accordingly, the loan officers' focus on tightness rather than the number of covenants would appear to be rational.

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[20] Unsecured bank loans account for a significant proportion of corporate debt (Cotter, 1998).

[21] The management was portrayed as a team whose reputation was unknown rather than unsatisfactory in order to maintain the credibility of the simulated loan application. Discussions with a focus group of senior loan officers confirmed that a particularly negative assessment of management's competence and integrity was likely to result in the loan application being rejected, thereby making the experimental task redundant.

[22] As financial risk was one of the independent variables being manipulated in this experiment, it was considered best not to simulate a breach of a gearing or related covenant. Mather (1999:66) provides evidence that a minimum current ratio is a relatively common financial covenant in Australian private debt contracts. Moreover, in preliminary (pre-pilot) discussions, several senior loan officers indicated that they would normally expect to see such a covenant in a retailer's debt contract.

[23] To decrease any possible skewness of the distributions, the analysis was also run using the data transformation Log(x+1). Transformations in analysis of variance are used to achieve homogeneity of variance and normality of distributions (Keppel, 1991). The results were consistent with those discussed in Sections 5.2 to 5.4.

**Table 1**
**Experiments I and II: Factor means and standard deviations**

| *Factors and factor levels* | *Number of covenants* | | *Tightness (1)* | | *Likelihood of waiver (2)* | |
|---|---|---|---|---|---|---|
| | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev |
| *Financial risk* | | | | | | |
| i Low | 4.26 | 1.40 | 3.74 | 1.81 | 2.89 | 1.86 |
| ii High | 4.31 | 1.22 | 3.29 | 1.67 | 3.78 | 2.11 |
| *Management reputation* | | | | | | |
| i Positive | 3.98 | 1.34 | 4.19 | 1.69 | N/A | N/A |
| ii Unknown | 4.60 | 1.20 | 2.84 | 1.54 | N/A | N/A |
| *Reason for technical default* | | | | | | |
| i Accounting Std. change | N/A | N/A | N/A | N/A | 2.69 | 1.87 |
| ii Actual deterioration | N/A | N/A | N/A | N/A | 3.98 | 1.99 |
| *Security* | | | | | | |
| i Yes | 3.78 | 1.32 | 4.47 | 1.56 | 2.08 | 1.26 |
| ii No | 4.79 | 1.09 | 2.56 | 1.37 | 4.59 | 1.88 |

*Notes:* (1) The Likert scale ranged from 1 (very restrictive) to 7 (not restrictive)
(2) The Likert scale ranged from 1 (waive) to 7 (not waive)

**Table 2**
**Experiment I - Analysis of variance summary**
**Association between loan officers' assessments of the number of covenants and borrower and/or contract-specific characteristics**

| *Source* | *df* | *MS* | *F* | *Significance* |
|---|---|---|---|---|
| **Main effects** | | | | |
| Financial risk (FR) | 1,46 | 0.13 | 0.03 | 0.860 |
| Management reputation (MR) | 1,46 | 19.38 | 56.34 | 0.000 |
| Security (S) | 1,46 | 49.01 | 61.57 | 0.000 |
| **Two-way interactions** | | | | |
| FR × MR | 1,46 | 0.05 | 0.14 | 0.715 |
| FR × S | 1,46 | 0.63 | 0.79 | 0.378 |
| MR × S | 1,46 | 0.01 | 0.02 | 0.900 |
| **Three-way interaction** | | | | |
| FR × MR × S | 1,46 | 1.17 | 3.58 | 0.065 |

### 5.2.2. *Management reputation*

Tables 2 and 3 indicate that the main effects for management reputation (p = 0.000) were significant. This supports hypothesis 2, which proposed that loan officers will utilise a more restrictive set of financial covenants in the bank loan contract of a borrower whose management team is unknown.

This result is consistent with the proposition that the need to provide lenders with a signal about impending difficulties, and the need for managers to preserve their reputation in debt markets provides incentives for the employment of a more restrictive set of covenants where management reputation is unknown.

### 5.2.3. *Security*

Hypothesis 3 implies significant main effects for the security factor. The hypothesis proposed that an unsecured loan would be associated with a more restrictive set of financial covenants. As can be seen from Tables 2 and 3, these main effects are significant (p = 0.000) and the hypothesis is supported.

This result is consistent with the proposition that, when loans are secured, the potential for conflicts between secured lenders and borrowers are reduced. This is because lenders' claims over specific assets limit the scope for asset substitution and claim dilution.

### *5.3. Interaction effect—management reputation × security (on tightness)*

Interactions are specifically concerned with the joint effects of two or more independent variables and are unique to the factorial design. The ANOVA summary in Table 3 shows that the effect of the two way interaction, management reputation × security, was significant (p = 0.037). The relevant interaction means are shown in Table 4 and are plotted in Figure 1.

The first set of simple effects was tested by comparing the security factor at each separate level of the management reputation factor. A comparison of the means 5.23 and 3.08 shows that, where management reputation is positive, the security effect is significant (F = 61.78, p = 0.000). Similarly, a comparison of the means 3.65 and 1.98 shows that the security effect is also significant when management reputation is unknown (F = 39.67, p = 0.000). The second set of simple effects was tested by comparing the management reputation factor at each separate level of the security factor. A comparison of the means 5.23 and 3.65 shows that when the loan is secured, the effect of management reputation is significant (F = 31.17, p = 0.000). However, a comparison of the mean 3.08 and 1.98 indicates that, when the loan is unsecured, this effect is not significant (F = 3.30, p = 0.073). The Tukey HSD tests (at the 0.05 level) confirmed these results.

This analysis shows that, when the loans are secured, covenants imposed when management reputation is positive are less restrictive than those imposed when management reputation is unknown. However, this is not the case when loans are unsecured. Accordingly, the main effect for management reputation discussed earlier requires

**Table 3**
**Experiment I - Analysis of variance summary**
**Association between loan officers' assessments of the tightness of covenants and borrower and/or contract-specific characteristics**

| *Source* | *df* | *MS* | *F* | *Significance* |
|---|---|---|---|---|
| **Main effects** | | | | |
| Financial risk (FR) | 1,46 | 22.01 | 5.70 | 0.021 |
| Management reputation (MR) | 1,46 | 86.67 | 101.71 | 0.000 |
| Security (S) | 1,46 | 174.42 | 147.13 | 0.000 |
| **Two-way interactions** | | | | |
| FR × MR | 1,46 | 0.88 | 1.03 | 0.315 |
| FR × S | 1,46 | 3.80 | 3.20 | 0.080 |
| MR × S | 1,46 | 2.76 | 4.63 | 0.037 |
| **Three-way interaction** | | | | |
| FR × MR × S | 1,46 | 0.63 | 1.06 | 0.309 |

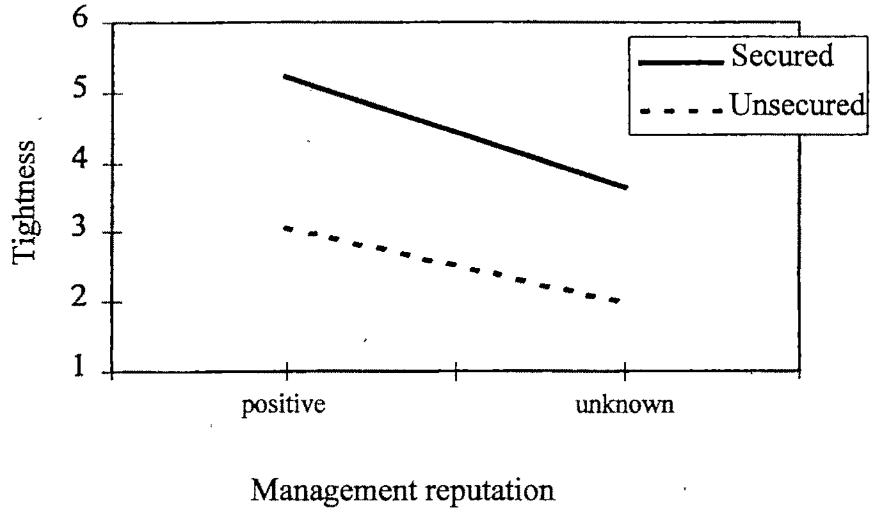
**Table 4**
**Experiment I - Interaction means for loan officers' assessments of the tightness of covenants: management reputation × security**

| *Management reputation* | *Security* | |
|---|---|---|
| | *Yes* | *No* |
| Positive | 5.23 | 3.08 |
| Unknown | 3.65 | 1.98 |

*Note:* (1) The Likert scale ranged from 1 (very restrictive/tight) to 7 (not at all restrictive/tight)

**Figure 1**
**Experiment I - Interaction means for loan officers' assessments of the tightness of covenants: management reputation – security**

**Management reputation – security - interaction**



some qualification to recognise this interaction with security. While this result may seem unusual, the descriptive statistics in Table 4 indicate that the security effect is dominant. Where the loan is unsecured, lenders indicate that covenants imposed are very tight with only an insignificant difference between borrowers whose management reputation is positive as opposed to unknown.

### *5.4. Waiver decision*

The overall ANOVA summary is presented in Table 5.

#### *5.4.1. Financial risk*

Hypothesis 4 proposed that loan officers are less likely to waive the technical default on a financial covenant by a borrower with relatively high financial risk. Consistent with this hypothesis, Table 5 shows that the main effect for the factor, financial risk, was significant (p = 0.007). The experimental design controlled for the borrower's IOS, thereby overcoming a criticism of the prior archival study (Chen and Wei, 1993).

This result supports the proposition that rational lenders are likely to foresee the greater incentives for borrowers with high financial risk to engage in post-contractual opportunism and the increased likelihood of debt service default. Accordingly, in the event of a technical default, they are likely to take action to protect their position, such as to seek additional security, increase the interest rate or even demand repayment of the loan, rather than waive the technical default.

#### *5.4.2. Reason for technical default*

As can be seen from Table 5, the main effect for the factor, reason for technical default, was significant (p = 0.000). This supports hypothesis 5, which proposed that loan officers are less likely to waive the technical default on a financial covenant where such a default is caused by an actual deterioration in the borrower's financial position, as opposed to a default caused by a change in an accounting standard. This is consistent with the argument that a potential, or actual technical, default would result in lenders re-evaluating borrower risk with a view to exercising one or more of the options available to them to protect their position. However, if the technical default is caused solely by a change to an accounting standard, there is no change in borrowers' cashflows and/or risk and it would be expected that lenders would waive the default. Given that a reputation for reasonableness is important for lenders in private debt markets, the opportunity cost to lenders of not granting a waiver in these circumstances would appear to be high.

#### *5.4.3. Security*

Hypothesis 6 suggests a significant main effect for the security factor. This hypothesis proposed that loan officers are less likely to waive the breach

**Table 5**
**Experiment II - Analysis of variance summary**
**Association between loan officers' assessments of the likelihood of waiving technical default and borrower and/or contract-specific characteristics**

| *Source* | *df* | *MS* | *F* | *Significance* |
|---|---|---|---|---|
| **Main effects** | | | | |
| Financial risk (FR) | 1,46 | 37.63 | 7.86 | 0.007 |
| Reason for tech. default (RD) | 1,46 | 302.51 | 158.45 | 0.000 |
| Security (S) | 1,46 | 78.80 | 120.53 | 0.000 |
| **Two-way interactions** | | | | |
| FR × RD | 1,46 | 0.42 | 0.22 | 0.641 |
| FR × S | 1,46 | 1.88 | 2.88 | 0.097 |
| RD × S | 1,46 | 0.88 | 1.42 | 0.239 |
| **Three-way interaction** | | | | |
| FR × RD × S | 1,46 | 0.42 | 0.68 | 0.413 |

of a financial covenant where the loan is unsecured. As can be seen from Table 5, the main effect was significant (p = 0.000) and the hypothesis is supported.

This result is consistent with the proposition that, where a loan is secured, rational lenders are likely to realise that the incentives for borrowers to engage in post-contractual opportunism are reduced. Accordingly, they are more likely to waive the technical default.

### *5.5. Temporary vs. unconditional waiver*

A waiver of a technical default on a covenant in a bank loan contract could be temporary or unconditional. Subjects who indicated that they were more likely to waive the breach were also asked to indicate, on a Likert scale, whether such a waiver was likely to be temporary or unconditional. The Likert scale ranged from 7 (waive temporarily) to 1 (waive unconditionally).

The mean response was 4.8 suggesting that many loan officers waived breaches on a temporary as opposed to an unconditional basis. It must be remembered that this result is based on a self-selected sample and as such must be considered exploratory, pending further research. Nevertheless, it highlights one of the problems faced by Chen and Wei (1993) and Beneish and Press (1993) in their studies of lenders' responses to technical default and the implications of technical default. Since they rely on publicly available archival information, it is usually not possible to ascertain the precise terms of a waiver; more specifically, the distinction between a temporary and unconditional waiver cannot be made with certainty.

## 6. Conclusions and limitations

These are the first behavioural experiments examining specific debt contracting processes, such as the choice of financial covenants and lenders' responses to technical default, reported in the literature. The research also helps to address the lack of prior research into such contracting processes in the Australian private debt market. The behavioural approach facilitated studying qualitative variables that are difficult to examine in archival research.

In experiment I, the main effects for the factors management reputation and security were significant, supporting the hypotheses that they are determinants of covenants in bank loan contracts. The factor financial risk provided mixed results, suggesting that many loan officers respond to the increased potential for post-contractual opportunism by borrowers with high financial risk by imposing tighter rather than more financial covenants. Since many of the financial covenants commonly used to address some of the problems directly associated with high financial risk, such as claim dilution, are interrelated, the loan officers' focus on tightness rather than the number of covenants appears to be rational.

A seemingly unusual two-way interaction between management reputation and security was also noted. This was driven by a dominant security factor, with lenders indicating that where loans were unsecured, covenants imposed were very tight, with only a marginal difference between borrowers whose management reputation was positive as opposed to unknown. This apparent dominance of the security variable warrants further investigation—for example, the effect of specific types of security on the covenant package.

The main effects of the three factors examined in experiment II were also significant. These were consistent with the hypotheses that loan officers are more likely to waive the technical default on a financial covenant by a borrower with relatively low financial risk, a secured loan or where the default is caused solely by a change in an accounting standard. Loan officers who stated that they were more likely to waive the breach also indicated that they were likely to waive breaches on a temporary, as opposed to unconditional, basis. However, the latter finding should only be considered exploratory.

As is the case with most experiments, one has to be cautious in generalising these results beyond the subjects or the specific context of the study—in particular, the industry sector studied.

The degree of artificiality necessarily inherent in experimental methodology also introduces several limitations that are specific to this research. First, it is apparent from the academic and professional banking literature that the terms of debt contracts, including any covenants therein, are the outcome of negotiation between borrowers and lenders. Experiment I only studies the 'supply' side of such covenants. While steps were taken to emphasise to subjects the need to consider the effect of normal market conditions and constraints, it is possible that some subjects responded with desired outcomes as opposed to more realistic or likely outcomes. A mitigating factor is that the borrower in this experiment was a medium sized private company. There is anecdotal evidence from the Australian private debt market to suggest that such entities do not have the same degree of 'negotiating power' and sophisticated management to negotiate contract terms as do larger and/or listed companies.

Second, it is acknowledged that loan officers' decisions on many contractual terms such as covenants, security, term and interest rates are likely to be interrelated (Day and Taylor, 1995:397). As a necessary limitation of the methodology, experiment I required subjects to make decisions on covenants with these terms given.

Third, the research studied loan officers' behaviour at a specific period in time: more specifically, when the debt market was quite competitive and during a period of economic growth. There is anecdotal evidence to suggest that such behaviour may vary. For example, relatively restrictive covenants and a relatively inflexible attitude towards technical default are likely during times of high debt service default. Accordingly, replication and/or longitudinal studies are desirable to support the generalisability of these results.

A survey of managers of Fortune 500 firms in the US found that covenants (together with projected cash flows, dilution of shareholders' claims and project risk) were considered to be a primary issue in financing decisions (Pinegar and Wilbricht, 1989). Accordingly, apart from the contribution to the academic literature, this study of the restrictiveness of financial covenants and lenders' waiver decisions is of potential interest to financial managers. Additionally, the significant result relating to the factor, reason for technical default, should be of interest to accounting standard setters in the context of planned changes to accounting standards.

## Appendix I
## Summary of the information given to subjects

*Experiment I*

a) Background information about the borrower including industry, markets, suppliers, distributors and employee relations;
b) Information about the loan (including purpose, term, and interest rate) that had been previously approved following the bank's normal credit evaluation procedures;
c) Three years' financial information comprising profit and loss statements, balance sheets and summary notes thereon;
d) A comparison of a range of the borrower's financial ratios with industry benchmarks;
e) Other information including details about the different levels of security and management reputation; and
f) An outline of the task to be performed.

*Experiment II*

a) Background information about the borrower including industry, markets, suppliers, distributors and employee relations;
b) Information about the loan that was originally approved (including purpose, term, and interest rate) and subsequent debt servicing;
c) Three years' financial information comprising profit-and-loss statements, balance sheets and summary notes thereon;
d) A comparison of a range of the borrower's financial ratios with industry benchmarks;
e) Other information, including details about the different levels of security and reasons for the breach;
f) Circumstances surrounding the breach of covenant; and
g) An outline of the task to be performed.

## References

Altman, E. I. (1985). 'Managing the commercial lending process', in *Handbook For Banking Strategy*. New York: John Wiley.

Barnea, A., Haugen, R. and Senket, L. (1985). *Agency Problems and Financial Contracting*. NJ: Prentice Hall.

Beneish, M. D. and Press, E. (1993). 'Costs of technical violation of accounting-based debt covenants'. *Accounting Review*, 68 (2): 233–257.

Berlin, M. and Mester, L. J. (1992). 'Debt covenants and renegotiation'. *Journal of Financial Intermediation*, 2: 95–133.

Chen, K. C. W. and Wei, K. C. J. (1993). 'Creditors' decisions to waive violations of accounting-based debt covenants'. *Accounting Review*, 68 (2): 218–232.

Citron, D. B. (1992). 'Financial ratio covenants in UK bank loan contracts and accounting policy choice'. *Accounting and Business Research*, 22 (Winter): 322–336.

Citron, D. B. (1995). 'The incidence of accounting-based covenants in UK public debt contracts'. *Accounting and Business Research*, 25 (Summer): 139–150.

Cotter, J. (1998). 'Utilisation and restrictiveness of covenants in Australian private debt contracts'. *Accounting and Finance*, 38: 181–196.

Danos, P., Holt, D. L. and Imhoff, E. A. Jr (1989). 'The use of accounting information in bank lending decisions'. *Accounting, Organisations and Society*, 14 (3): 235–246.

Day, J. F. S. and Taylor, P. J. (1995). 'Evidence on practices of UK bankers in contracting for medium-term debt'. *Journal of International Banking Law*, 10 (9): 394–401.

Day, J. F. S. and Taylor, P. J. (1996). 'Bankers' perspectives on the role of covenants in debt contracts'. *Journal of International Banking Law*, 11 (5): 201–205.

Day, J. F. S. and Taylor, P. J. (1998). 'The role of debt covenants in UK corporate governance'. *Journal of Management and Governance*, 2 (2): 171–190.

DeAngelo, H., DeAngelo, L. and Skinner, D. (1994). 'Accounting choice in troubled companies'. *Journal of Accounting and Economics*, 17: 113–143.

DeFond, M. L. and Jiambalvo, J. (1994). 'Debt covenant violation and manipulation of accruals'. *Journal of Accounting and Economics*, 17: 145–176.

El-Gazzar, S. and Pastena, V. (1991). 'Factors affecting the scope and initial tightness of covenant restrictions in private lending agreements'. *Contemporary Accounting Research*, 8 (1): 132–151.

Fama, E. F. (1980). 'Agency problems and the theory of the firm'. *Journal of Political Economy*, 88 (2): 288–307.

Foster, R. A. and Stewart, S. E. (1991). 'Australian Economic Statistics, 1949–50 to 1989–90', *RBA Occasional Paper No. 8*.

Franks, J. R. and Torous, W. N. (1989). 'An empirical investigation of US firms in reorganization'. *Journal of Finance*, XLIV (3): 747–769.

Gopalakrishnan, V. and Parkash, M. (1995). 'Borrower and lender perceptions of accounting information in corporate lending agreements'. *Accounting Horizons*, 9 (1): 13–26.

Greenwald, A. G. (1976). 'Within-subjects designs: to use or not to use?' *Psychological Bulletin* (March): 314–320.

Harsha, P. D. and Knapp, M. C. (1990). 'The use of within- and between-subjects experimental designs in behavioral accounting research: a methodological note'. *Behavioral Research in Accounting*, 2: 50–62.

Keppel, G. (1991). *Design and Analysis: A Researcher's Handbook*. New Jersey: Prentice Hall.

Malitz, I. (1986). 'On financial contracting: the determinants of bond covenants'. *Financial Management* (Summer): 18–25.

Mather, P. R. (1999). 'Financial covenants in Australian private debt contracts: incidence, measurement rules and monitoring'. *Australian Accounting Review*, 6 (1): 63–72.

Myers, S. C. (1977). 'Determinants of corporate borrowing'. *Journal of Financial Economics*, 5: 147–175.

Pany, K. and Reckers, P. M. J. (1980). 'The effect of gifts, discounts, and client size on perceived auditor independence'. *Accounting Review*, LV (1): 50–61.

Pinegar, M. and Wilbricht, L. (1989). 'What managers think of capital structure: a survey'. *Financial Management* (Summer): 82–91.

Sami, H. and Schwartz, B. N. (1992). 'Alternative pension liability disclosure and the effect on credit evaluation: an experiment'. *Behavioural Research in Accounting*, 4: 49–61.

Sharpe, S. A. (1990). 'Asymmetric information, bank lending and implicit contracts: a stylized model of customer relations'. *Journal of Finance*, 45: 1,069–1,087.

Smith, C. W. (1993). 'A perspective on accounting-based debt covenant violations'. *Accounting Review*, 68 (2): 289–303.

Smith, C. W. and Warner, J. B. (1979). 'On financial contracting: an analysis of bond covenants'. *Journal of Financial Economics*, 7: 117–161.

Stulz, R. and Johnson, H. (1985). 'An analysis of secured debt'. *Journal of Financial Economics*, 14: 501–521.

Whittred, G. and Zimmer, I. (1986). 'Accounting information in the market for debt'. *Accounting and Finance*, 26: 19–33.

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# An examination of the information content of Danish earnings and cash flows

**Thomas Plenborg***

**Abstract**—This study examines the information content of earnings and cash flows on the basis of Danish data. The study is motivated by the recent implementation of the Danish cash flow standard RV 11. No prior studies have examined the information content of Danish cash flows. In addition, the results of non-Danish cash flow studies are not consistent. Thus, there is no clear evidence as to whether cash flows have incremental information content beyond that of earnings. Finally, most cash flow studies focus only on cash flow from operations (CFO). This study also examines the information content of cash flow after investments (CFAI) and net cash flow (NCF). The results of the various tests are generally consistent with the following statements: (1) earnings are relatively more informative than cash flows; (2) the aggregated effect of cash flows has incremental information content beyond that of earnings; (3) after controlling for the effect of earnings, CFO (NCF) is negatively (positively) associated with the contemporaneous annual stock return at conventional significance levels. The coefficient on CFAI is not statistically different from zero; (4) over longer return intervals, the incremental information content of cash flows beyond earnings is maintained.

## 1. Introduction

This study examines the information content of Danish earnings and cash flows. The study is motivated by the recent implementation of the Danish cash flow standard RV 11, which became effective on 1 July, 1996. RV 11 requires Danish listed companies to report a cash flow statement in addition to the traditional financial statements: income statement and balance sheet. Although prior studies have examined similar research questions on the basis of non-Danish data, no prior study has compared the information content of Danish earnings and cash flows. An examination of Danish earnings and cash flows is also interesting in the light of the increasing trade across borders. In 1993, 5% of the total market value of Danish listed companies was owned by foreign investors. By 1995, this had increased to approximately 18% and is expected to increase to 30% by 1998 (Andersen, 1996). This leads to an increased need among investors outside Denmark to obtain knowledge about the information content of Danish earnings and cash flows.[1]

Existing empirical evidence is not conclusive with respect to the information content of cash flows. Based on US data, Rayburn (1986), Wilson (1986 and 1987), Bowen et al. (1987), Livnat and Zarowin (1990) and Ali (1994) all find that cash flows have incremental information content beyond that of earnings. Using Finnish and UK data, respectively, Kinnunen and Niskanen (1993) and Clubb (1995) obtain similar results. On the other hand, applying US data Bernard and Stober (1989) find that cash flows have no incremental information content beyond earnings. Ali and Pope (1995) argue that one reason for the inconsistency among the various cash flow papers may be that earnings are relatively more informative in some countries than others. Plenborg (1996) finds some evidence which indicates that Danish earnings are more informative than US earnings. Using the argument put forward by Ali and Pope (1995) it could therefore be expected that Danish cash flows have no incremental information content beyond Danish earnings.

Another motivation for this study is that most studies examining the information content of cash flows focus only on the working capital from operations (WCFO) and cash flow from operations (CFO). Given that WCFO contains a high level of accruals, CFO is the only pure cash flow measure

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[1] The assumption underlying this argument is that investors in Denmark behave in a manner similar to that of investors outside Denmark.

which has been examined thoroughly. However, in practice cash flow after investment (CFAI) is frequently used. Dechow (1994) finds that the information content of net cash flow (NCF) seems to be higher than that of CFO. This study therefore examines the information content of these cash flow measures as well. Finally, as mentioned above, the evidence resulting from previous cash flow studies has been inconsistent with respect to the incremental information content of cash flows beyond earnings. Both Easton et al. (1992) and Dechow (1994) find empirical support for a stronger association between the contemporaneous stock return and earnings/cash flows over long return intervals. Given that the incremental information content of cash flows beyond earnings has not been examined in relation to return intervals beyond one year, this study examines the incremental information content of cash flows beyond earnings using return intervals of one and four years.

Based on Danish data, this study finds that earnings are relatively more informative than various cash flow measures. However, the aggregated effect of cash flows has incremental information content beyond earnings. Further, the individual cash flow variables CFO and NCF both have incremental information content beyond that of earnings. CFO is negatively associated with the contemporaneous stock return, and NCF is positively associated with it. A negative coefficient on CFO indicates that investors respond more favourably to one dollar of current accruals than to one dollar of investment; a positive coefficient on NCF indicates that investors respond more favourably to one dollar of NCF than to one dollar of financing (see Section 2.1 below). The coefficient on CFAI is not statistically different from zero. Over longer return intervals, the incremental information content of cash flows beyond earnings is maintained. Overall, these findings empirically justify the inclusion of a cash flow statement in Danish financial statements.

This study proceeds as follows: First, the sample and data used in this study are described. Second, the methodology applied in this study is outlined. Finally, the empirical results are presented and discussed and conclusions are drawn on the basis of these results.

## 2. Data and sample description

The data are obtained from Account Data DK, which is a comprehensive database containing all financial statement information (with the exception of the directors' report) relating to companies listed at the Danish stock exchange since 1983. The sample period spans from 1983 to 1992 with an average of 121 observations[2] each year. The sample comprises companies representing the commercial, service and manufacturing industries.[3] At least two years of consecutive observations for all the variables of interest are required to be able to calculate the unexpected component of each variable on the basis of the random walk assumption. Where a company changed its financial year-end, the corresponding company-year was deleted.

Companies on the Danish stock market may issue both A and B classes of common stocks, as well as preferred stocks.[4] In this study, the B class have been used to calculate the stock return as these stocks are most commonly traded and therefore most likely to reflect the underlying economic reality. However, in a few cases the preferred class or A class have been used rather than the B class, due to the fact that much longer time series are available for these stocks as compared with the B class.[5]

In the empirical literature four measures of cash flow are generally applied:

- working capital from operations (similar to cash earnings) (WCFO);
- cash flow from operations (CFO);
- cash flow after investments/free cash flow (CFAI);
- net change in total cash flow (includes operating, investment and financial cash flows) (NCF).

While most empirical studies have focused on CFO and WCFO (e.g. Rayburn, 1986, Wilson, 1986/87 and Ali 1994), only a few studies have examined the usefulness of the CFAI and NCF (Livnat and Zarowin, 1990 and Clubb, 1995, examine variations of the CFAI and NCF). This study examines all three cash flow measures, as well as three accrual-based performance measures: net income (NI), comprehensive income (CI) and WCFO.[6] Because of the flexibility built into the Danish accounting system, several accounting items are allowed to bypass the income statement.

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[2] After deletion of outliers. Several deletion procedures have been applied in this study without affecting the results reported. The deletion procedure applied in the results reported in this study is as follows: all *absolute* change (level) specifications of earnings and cash flows greater than two (three) are deleted. In general, 2–5% of the sample is deleted due to outliers.

[3] Certain property companies are included as well.

[4] A-class common stocks typically contain ten times as many votes as B-class common stocks. In rare cases, companies may have three classes of common stocks (including a C-class of common stock). In such cases, C-class common stocks typically share the same voting properties as B-class common stocks.

[5] An example of this is the Progress shipping company where the stock return is calculated on the basis of the A-shares. An informal calculation also shows that companies with different share classes generate approximately the same return for each share class.

[6] In line with Bowen et al. (1987), this study regards WCFO as an accrual-based performance measure.

This explains the inclusion of CI in this study (see Plenborg, 1996).[7] In Appendix A, the definition of the variables examined is outlined.

In the period covered by this sample, Danish Generally Accepted Accounting Principles (GAAP) did not require companies to provide a cash flow statement. To determine the variables used in this study, a cash flow statement has therefore been constructed on the basis of information taken from the income statement, balance sheet and notes. This is in line with prior research on this issue (see Bernard and Stober, 1989). However, due to limitations in the disclosure of Danish listed companies, there is likely to be some noise in the Danish cash flow estimates. This noise may, for example, be created by the following:

- the distinction between realised and unrealised gains and losses on financial assets and marketable securities;
- the cash flow content of extraordinary items;
- foreign currency translation and transactions;
- the lack of any disclosure requirement in relation to groups prior to 1992 (most groups disclosed information on a voluntary basis);
- the cash flow content of 'sundries related to shareholders' equity';
- changes in accounting principles.

In a related study, Plenborg (1996) finds that the information content of cash flows increases when estimated cash flow measures containing a high level of measurement error are removed from the sample. In this study, observations will be deleted if differences exist between the actual and the estimated cash flows. However, the actual cash flow measure is only available for the NCF. The deletion procedure is therefore applied only in relation to the NCF. In this study the NCF estimate is deleted if it deviates from the actual NCF by +/−10%. This eliminates about 40% of the observations.[8]

### 2.1. *Model specification*

In line with Harris et al. (1994), this study compares the information content of earnings and cash flows by comparing the explanatory power of the following two specifications:

$$R_{it}=\alpha_0+\alpha_1\Delta NI_{it}/P_{it-1}+\alpha_2 NI_{it}/P_{it-1}+\varepsilon_{it} \qquad (1a)$$

$$R_{it}=\alpha_0+\alpha_1\Delta \text{cash flow proxy}_{it}/P_{it-1}+\alpha_2 \text{cash flow proxy}_{it}/P_{it-1}+\varepsilon_{it} \qquad (1b)$$

Recent innovations in earnings-return models suggest that the current level of earnings, together with changes in earnings, each deflated by the market value of equity, provide a better proxy of unexpected earnings than the change variable alone [Easton and Harris (1991), Ohlson and Shroff (1992) and Strong and Walker (1993)]. Ali and Pope (1995) obtain identical results for cash flows. Both a change and a level specification of earnings and cash flows are therefore used in this study.[9,10,11] Two different return specifications are employed in this study: market-adjusted return[12] and size-adjusted return.[13] Further, 12-month return windows finishing 0, three and six months after the financial year-end are used. This ensures that relevant information releases occur within the return window applied. In order to examine whether the explanatory power of accrual and cash flow-based performance measures are significantly different from each other, Voung's (1989) Z-statistics are applied. Dechow (1994) applies this methodology when comparing the explanatory power of US earnings and cash flows.

The incremental information content of cash flows beyond that of earnings is examined in a multiple regression framework similar to that used by Bowen et al. (1987) and Ali (1994):

$$\begin{aligned}R_{it}={}&\beta_0+\beta_1\Delta NCF_{it}+\beta_2 NCF_{it}+\beta_3\Delta CFAI_{it}+\\&\beta_4 CFAI_{it}+\beta_5\Delta CFO_{it}+\beta_6 CFO_{it}+\\&\beta_7\Delta WCFO_{it}+\beta_8 WCFO_{it}+\\&\beta_9\Delta NI_{it}+\beta_{10} NI_{it}+\varepsilon_{it}\end{aligned} \qquad (2a)$$

In examining earnings and cash flows as competing performance measures, Dechow (1994) finds that the information content of both earnings and cash flows increases as the return interval lengthens. However, considering earnings and cash flows measured over longer return intervals as complementary performance measures has not received any attention in the literature. Given mixed evidence as to whether cash flows have incremental information content beyond that of earnings, this study examines whether more consistent results are obtained using longer return intervals.

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[7] As both earnings measures yield identical results only the results of NI will be reported.

[8] It should be noted that this deletion procedure might be inappropriate. Biases in CFO might be offset by other biases in investments and/or finances. Consequently, in order to examine the impact of this deletion procedure, the test will also be made with the complete sample.

[9] The application of a change and level specification is also in line with Ohlson's (1991) model which includes both earnings level and book value. The first-difference of earnings and book value equals the change and level specification of earnings.

[10] In this context it is important to note that the time-series properties of Danish earnings and cash flows are remarkably similar to the time-series properties of US earnings and cash flows (Plenborg, 1996).

[11] Ali and Zarowin (1992) show that the sum of the coefficients on the level and change variables gives the coefficient on the unexpected component of earnings (cash flows).

[12] The market-adjusted return is calculated as the raw return for $\text{company}_i$ less the value-weighted market return based on the total Danish market index.

[13] One problem in relation to size-adjusted return is that when relatively small samples (e.g. the Danish stock market) are used a trade-off has to be made between an increased versus a decreased number of portfolios. If more portfolios are used, the impact of an extreme observation will be more severe than if fewer portfolios are used. On the other hand, if fewer portfolios are created, the size-related return might be more difficult to detect. In this study five portfolios are used.

As pointed out by Easton et al. (1992) and Dechow (1994), measurement errors in earnings and cash flows decrease as the return interval is extended.[14] Thus, by employing longer return intervals, it is possible to measure the incremental information content of cash flows beyond that of earnings with only limited measurement errors in earnings and cash flows variables. Since measurement errors in both earnings and cash flows are expected to decrease as the return intervals lengthen, it is difficult to predict whether, over longer return intervals, cash flows will have incremental information content beyond that of earnings. To examine the incremental information content of cash flows beyond earnings, the following model is specified:

$$\mathrm{AR}_{iT}=\beta_0+\beta_1\mathrm{ANCF}_{iT}/\mathrm{P}_{i0}+\beta_2\mathrm{ACFAI}_{iT}/\mathrm{P}_{i0}+\beta_3\mathrm{ACFO}_{iT}/\mathrm{P}_{i0}+\beta_4\mathrm{AWCFO}_{iT}/\mathrm{P}_{i0}+\beta_5\mathrm{ANI}_{iT}/\mathrm{P}_{i0}+\varepsilon_{it} \tag{2b}$$

where $\mathrm{AR}_{iT}$ equals price at time T (T=1,2,3,4) plus accumulated dividends over the return period minus price at the beginning of the return period ($\mathrm{P}_0$) and then divided by $\mathrm{P}_0$, for $\mathrm{company}_i$. $\mathrm{ANCF}_{iT}$, $\mathrm{ACFAI}_{iT}$, $\mathrm{ACFO}_{iT}$ $\mathrm{AWCFO}_{iT}$ and $\mathrm{ANI}_{iT}$ equal the sum of NCF, CFAI, CFO, WCFO and NI per share, respectively, over the period 1 to T, for $\mathrm{company}_i$.

As in Easton et al. (1992), only a level specification is applied. Easton et al. show that the effect of adjusting actual earnings for expected earnings would be reflected only in the regression's estimated intercept, while the estimated slope coefficient and $R^2$ would remain unaffected. Further, over longer return intervals, expected earnings depend less on information at date T=0.[15]

Specifications 2a and 2b correspond with the specification generally employed in the cash flow literature. Seventeen out of 19 studies which have examined the incremental information content of cash flows beyond earnings used a similar specification.

The interpretation of specification 2a is as follows[16]: a positive coefficient on NCF indicates that investors respond more favourably to one dollar of NCF than to one dollar of financing. A positive coefficient on CFAI indicates that investors respond more favourably to one dollar of financing than to one dollar of investment. A positive coefficient on CFO indicates that investors respond more favourably to one dollar of investment than to one dollar of current accruals (CA). A positive coefficient on WCFO indicates that investors respond more favourably to one dollar of CA than to one dollar of non-current accruals (NCA). Finally, a positive coefficient on NI indicates that NCA has information content conditional on the other variables in the specification. Bernard and Stober (1989) and Jennings (1990) discuss in detail the interpretation of similar specifications.

## 3. Summary statistics

Table 1 reports summary statistics. The levels of earnings and cash flows are similar to the earnings and cash flows reported in most prior studies. Moreover, the cash flow variables fluctuate more than accrual-based performance measures. For example, the standard deviation of CFAI is more than twice the standard deviation of NI. This also implies that a level specification is comparatively more appropriate to use in relation to cash flows (due to a relatively higher proportion of transitory items) as compared with earnings. It is also interesting to observe that in the period of interest Danish companies invested quite heavily in intangible, tangible and financial assets. While the mean (median) value of CFO is 0.137 (0.103) the mean (median) value of CFAI is −0.082 (−0.029).

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[14] Arbitrary cost allocation and timing and matching problems are examples of measurement errors in earnings and cash flows, respectively.

[15] The justification for a level specification in Easton et al. rests on an assumption that the earnings capitalisation factor is cross-sectionally constant. This assumption may be strained when applied to long windows. Spurious coefficients on independent variables may result from the variables proxying for cross-sectional variation in risk and growth.

[16] The interpretation is based on the following relationship

$$R_{it}=\alpha_0+\alpha_1\mathrm{NCF}_{it}+\alpha_2\mathrm{F}_{it}+\alpha_3\mathrm{I}_{it}+\alpha_4\mathrm{CA}_{it}+\alpha_5\mathrm{NCA}_{it}+\varepsilon_{it}.$$

where F, I, CA, NCA are financing, investing, current accruals and noncurrent accruals, respectively. Replacing F, I, CA and NCA with CFAI-NCF, CFO-CFAI, WCFO-CFO and NI-WCFO yields

$$R_{it}=\alpha_0+\alpha_1\mathrm{NCF}_{it}+\alpha_2(\mathrm{CFAI}_{it}-\mathrm{NCF}_{it})+\alpha_3(\mathrm{CFO}_{it}-\mathrm{CFAI}_{it})+\alpha_4(\mathrm{WCFO}_{it}-\mathrm{CFO}_{it})+\alpha_5(\mathrm{NI}_{it}-\mathrm{WCFO}_{it})+\varepsilon_{it}.$$

This equation can be rearranged as

$$R_{it}=\alpha_0+(\alpha_1-\alpha_2)\mathrm{NCF}_{it}+(\alpha_2-\alpha_3)\mathrm{CFAI}_{it}+(\alpha_3-\alpha_4)\mathrm{CFO}_{it}+(\alpha_4-\alpha_5)\mathrm{WCFO}_{it}+\alpha_5\mathrm{NI}_{it}+\varepsilon_{it}.$$

**Table 1**
**Summary statistics after deletion of bias cash flow measures**

| *Variable* | *N*[a] | *Mean* | *Median* | *Std.* | *Min.* | *Max.* |
|---|---|---|---|---|---|---|
| NI[b] | 551 | 0.067 | 0.069 | 0.23 | −1.13 | 2.37 |
| WCFO[c] | 551 | 0.161 | 0.136 | 0.25 | −0.90 | 2.36 |
| CFO[d] | 551 | 0.137 | 0.103 | 0.34 | −1.36 | 2.60 |
| CFAI[e] | 551 | −0.082 | −0.029 | 0.47 | −2.80 | 2.67 |
| NCF[f] | 551 | 0.019 | 0.009 | 0.31 | −1.50 | 1.67 |
| Retma[g] | 551 | 0.021 | −0.047 | 0.43 | −0.86 | 2.24 |

a. N is the number of observations.
b. NI is the net income deflated by the beginning of period price.
c. WCFO is the working capital from operation deflated by the beginning of period price.
d. CFO is the cash flow from operation deflated by the beginning of period price.
e. CFAI is the cash flow after investments deflated by the beginning of period price.
f. NCF is the net cash flow including the change in marketable securities (available for sales) deflated by the beginning of period price.
g. Retma is the market-adjusted return. It is calculated by deducting the value-weighted market return (total index) from the stock return of company, over the 12 months extending from nine months prior to the fiscal year-end to three months after the fiscal year-end.

## 4. A comparison of the relative information content of accrual and cash flow-based performance measures

Tables 2 and 3 present the results of the comparison of the information content of earnings and cash flows.

In the pooled regressions as well as in the annual cross-sectional regressions, the accrual-based performance measures (NI and WCFO) have an information content which is greater than that of any of the cash flow measures. The explanatory power of NI and WCFO taken from the pooled sample is consistently higher than the explanatory power of any of the three cash flow measures. While the explanatory power of NI and WCFO fluctuates between 9.0 and 15.4, the explanatory power of the three cash flow measures varies between 0.0 and 4.4. In addition, the difference in information content between NI/WCFO and the three cash flow measures is significant at conventional significance levels. This finding is consistent across both market-adjusted returns and size-adjusted returns. The annual cross-sectional regressions generally support the findings from the regression using the pooled sample, although the Voung (1989) Z-statistics are often insignificant. The lack of significance (especially when NI and CFO/NCF are compared) is clearly due to the low number of observations. Accordingly, most weight is given to the results obtained in the pooled sample in this study.

As can be seen from Table 3, the results from one to four-year return windows remain similar to the results reported in Table 2 below. While there is some evidence which indicates that the difference between the information content of NI/WCFO and CFO/NCF decreases as the return window is extended, both NI and WCFO remain relatively more informative than CFO and NCF. This result confirms the findings of Dechow (1994). While the explanatory power of NI and WCFO increases almost linearly with the length of the return window, the explanatory power of CFAI remains close to zero. On the basis of these tests it is therefore reasonable to conclude that accrual-based earnings measures are relatively more informative than various cash flow measures. This result supports the findings of Ali (1994) and Dechow (1994).

### *4.1. The incremental information content of cash flows beyond the information content of earnings*

Tables 4 and 5 present the tests of the incremental information content of cash flows beyond earnings. First, a test is carried out which examines the null hypothesis that the coefficients on the cash flow variables are all equal to zero when NI and WCFO are included in the model. As can be seen from Table 4, the F-ratio is significant at conventional significance levels in both the regression using pooled data and in the annual cross-sectional regressions. On an overall basis the cash flow variables have incremental information content beyond NI and WCFO. This is also in line with Bowen et al. (1987) who, on the basis of US data, find that CFO and CFAI together have incremental information content beyond that of the accrual-based performance measures (NI and WCFO).

**Table 2**
**Comparison of the explanatory power of earnings (NI) and cash flow-based performance measures**

**Model**[a]: $R_{it} = {}_{\alpha 0t} + \beta_{1t}(\Delta x_{it}/P_{it-1}) + \beta_{2t}(x_{it}/P_{it-1}) + {}_{\epsilon it}$

| *Year* | $\Sigma\beta_{NI}$ | $R^2_{NI}$ | $\Sigma\beta_{WCFO}$ | $R^2_{WCFO}$ | $\Sigma\beta_{CFO}$ | $R^2_{CFO}$ | $\Sigma\beta_{CFAI}$ | $R^2_{CFAI}$ | $\Sigma\beta_{NCF}$ | $R^2_{NCF}$ | $R^2_{NI}-R^2_{WCFO}=0$ | $R^2_{NI}-R^2_{CFO}=0$ | $R^2_{NI}-R^2_{CFAI}=0$ | $R^2_{NI}-R^2_{NCF}=0$ | $N^b$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Annual cross-sectional regressions:** | | | | | | | | | | | | | | | |
| 1985 | 2.24 | 12.9 | 0.95 | 2.9 | 0.00 | −4.2 | 0.01 | −4.5 | −0.37 | 15.5 | 2.11*** | 3.54*** | 3.57*** | −0.71 | 40 |
| 1986 | 1.48 | 21.0 | 0.96 | 10.2 | 0.66 | 11.0 | 0.37 | 7.2 | 0.40 | 6.5 | 0.76 | 0.46 | 0.75 | 0.82 | 50 |
| 1987 | 1.22 | 38.9 | 0.59 | 37.6 | 0.16 | 33.6 | 0.05 | 23.5 | 0.05 | 0.0 | 0.18 | 0.63 | 1.28 | 2.95*** | 64 |
| 1988 | 1.23 | 16.9 | 1.08 | 41.9 | 0.96 | 26.2 | −0.18 | 1.4 | 0.44 | 13.8 | −2.56** | −0.93 | 1.34 | 0.28 | 85 |
| 1989 | 0.43 | 2.4 | 1.01 | 12.1 | 0.44 | 3.2 | 0.10 | 1.8 | 0.19 | 0.0 | −1.12 | −0.09 | 0.08 | 0.39 | 79 |
| 1990 | 0.59 | 8.1 | 0.46 | 10.0 | 0.15 | 4.9 | 0.03 | −2.4 | 0.18 | 0.0 | −0.72 | 0.94 | 2.41** | 0.20 | 76 |
| 1991 | 0.90 | 16.2 | 0.79 | 18.0 | 0.11 | 2.5 | −0.09 | 4.2 | 0.47 | 6.7 | −0.46 | 2.58*** | 1.91* | 0.88 | 78 |
| 1992 | 1.22 | 31.3 | 0.77 | 20.0 | 0.47 | 11.8 | 0.09 | 7.9 | 0.51 | 9.9 | 1.80* | 2.11** | 2.41** | 2.26** | 62 |
| Mean | | 18.5 | | 19.1 | | 11.1 | | 4.9 | | 6.6 | | | | | 67 |
| **Pooled sample:** | | | | | | | | | | | | | | | |
| Retma[d] | 0.86 | 12.3 | 0.66 | 14.4 | 0.23 | 4.4 | 0.03 | 1.0 | 0.20 | 2.7 | −0.33 | 3.22*** | 3.71*** | 3.42*** | 551 |
| Size[e] | 0.72 | 11.0 | 0.67 | 15.4 | 0.20 | 3.6 | 0.00 | 0.0 | 0.18 | 2.3 | −1.83* | 2.56** | 3.11*** | 2.71*** | 551 |

a. Description of regression variables: $R_{it}$ is the raw return in a share of company$_i$ over the 12 months extending from nine months prior to the fiscal year-end to three months after the fiscal year-end. $X_{it}$ is the net income, the working capital from operation, the cash flow from operation, the cash flow after investments and the net cash flow per share in company$_i$ for the period$_t$, $P_{it-1}$ is the price per share of company$_i$ at time$_{t-1}$, and $\epsilon_{it}$ is a random distribution term assumed to be distributed $\epsilon$ N(0,$_\sigma$).

b. N is the number of observations in each regression.

c. Voung's Z-statistics:

* Significant at $0.05 < = \alpha < = 0.10$

** Significant at $0.01 < = \alpha, = 0.05$

*** Significant at $\alpha < = 0.01$

d. Retma is the market-adjusted return. It is calculated by deducting the value-weighted market return (total index) from the stock return of company$_i$.

e. Size is the size-adjusted return. It is calculated by separating the companies into five portfolios on the basis of their market value and subtracting the average stock return from each portfolio from company$_i$'s raw return.

**Table 3**

**Comparison of the explanatory power of earnings (NI) and cash flow-based performance measures—long windows**

**Model**[a]: $AR_{IT} = {}_{\alpha 0} + \beta_1 (AX_{IT}/P_{it-1}) + {}_{eit}$

| *Window* | $\beta_{NI}$ | $R^2_{NI}$ | $\beta_{WCFO}$ | $R^2_{WCFO}$ | $\beta_{CFO}$ | $R^2_{CFO}$ | $\beta_{CFAI}$ | $R^2_{CFAI}$ | $\beta_{NCF}$ | $R^2_{NCF}$ | $R^2_{NI} - R^2_{WCFO} = 0$<br>$R^2_{NI}/R^2_{WCFO}$ | $R^2_{NI} - R^2_{CFO} = 0$<br>$R^2_{NI} - R^2_{CFO} = 0$ | $R^2_{NI}/R^2_{CFAI}$<br>$(R^2_{NI} - R^2_{CFAI})$ | $R^2_{NI}/R^2_{NCF}$<br>$(R^2_{NI} - R^2_{NCF})$ | *DW*[b] | *N*[c] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Year | 0.44 | 8.3 | 0.15 | 8.8 | 0.10 | 4.3 | 0.04 | 0.0 | 0.14 | 1.9 | −0.11[d]<br>(0.94) | 1.80*<br>(1.93) | 2.83***<br>(-) | 2.39**<br>(4.36) | 2-2.1 | 685 |
| 2 Year | 0.85 | 18.0 | 0.20 | 7.0 | 0.15 | 4.0 | 0.02 | 0.0 | 0.18 | 2.6 | 1.36<br>(2.57) | 1.92*<br>(4.50) | 2.72***<br>(-) | 2.23**<br>(6.92) | 1.6 | 519 |
| 3 Year | 0.94 | 17.2 | 0.67 | 20.8 | 0.41 | 11.1 | 0.02 | 0.0 | 0.45 | 6.3 | −0.27<br>(0.83) | 1.00*<br>(1.55) | 2.83***<br>(-) | 2.17**<br>(2.73) | 1.4-1.5 | 359 |
| 4 Year | 0.97 | 21.5 | 0.63 | 21.6 | 0.39 | 11.7 | 0.02 | 0.0 | 0.44 | 5.5 | −0.04<br>(1.0 ) | 2.17**<br>(1.83) | 2.78***<br>(-) | 2.52**<br>(3.91) | 1.2-1.4 | 245 |

a. Description of regression variables: $AR_{IT}$ is the aggregated raw return on a share in $company_i$ over time ${}_{(t-1,T)}$ beginning nine months prior to the fiscal $year\text{-}end_{t-1}$ and ending three months after the fiscal year-end of $year_T$. $AX_{IT}$ is the aggregated net income, working capital from operation, cash flow from operation, cash flow after investment and net cash flow per share in $company_i$ for the $period_{(t-1,T)}$, $P_{it-1}$ is the price per share of $company_i$ at time ${}_{t-1}$ and $e^{IT}$ is a random distribution term assumed to be distributed ${}^{e}{\sim}N(0,{}_{\alpha})$.

b. DW is Durbin-Watson statistics which examine the effect of interdependence due to the use of long windows.

c. N is the number of observations in the regressions.

d. Voung's Z-statistics:

* Significant at $0.05 <= \alpha <= 0.10$

** Significant at $0.01 <= \alpha, = 0.05$

*** Significant at $\alpha <= 0.01$

When all accrual and cash flow-based performance measures are included in the regression, the coefficients on the individual earnings measures NI and WCFO are positive and significant at conventional significance levels. This finding is valid for market-adjusted returns. When size-adjusted return is used as dependent variable, both the coefficient on NI and the coefficient on WCFO are positive; however, only the coefficient on WCFO is significant at conventional significance levels. The annual cross-sectional regressions generally support these findings.

In the pooled regression, the coefficient on the individual cash flow variable CFO is negative and significant at conventional significance levels. This finding is valid across both return measures. Findings from the annual cross-sectional regressions are relatively more mixed. While the coefficient on CFO is positive in five out of eight years, it is negative or zero in the remaining three years. In the pooled regression, the coefficient on CFAI is close to zero and not significant at conventional significance levels. This finding holds across both return metrics applied in this study. The findings obtained in relation to the annual cross-sectional regressions contradict the findings obtained in the pooled regression. In two (one) years the coefficient on CFAI is negative (positive) and significant at conventional significance levels.

Several explanations can be given for these inconsistent findings. First, the sample employed in the annual cross-sectional regressions is very small, which means that the parameter estimates based on the annual cross-sectional regressions are associated with greater uncertainty than is the case with the parameter estimates which are based on the pooled regression. On the other hand, the parameter estimates resulting from the pooled regression are based on the assumption that the relationship between the accounting variables (earnings and cash flows) and the contemporaneous stock return is stable across time. If this is not the case, biases will arise in the parameter estimates based on the pooled regression.[17]

On the basis of a pooled regression, the coefficient on NCF is positive and significant at conventional significance levels. This finding holds across both return measures. Furthermore, the annual cross-sectional regressions are generally in line with the results obtained when the data are pooled. In six out of eight years the coefficient on NCF is positive. The coefficient on NCF is negative only in two years.

The incremental information content of cash flows beyond earnings is maintained as the return intervals are expanded from one to four years. When return windows between one and four years are applied, the null hypothesis that the coefficients on the cash flow variables are all equal to zero is rejected at the 1% significance level.[18] Further, the coefficient on CFO is negative and significantly different from zero when two and four year return windows are applied. The coefficient on NCF is positive across all four return windows and significantly different from zero when one to three year return windows are applied. Only the coefficient on CFAI is close to zero in all four return windows. Thus, the results reported in Table 5 are generally in line with the results reported in Table 4. These findings indicate that, even after controlling for measurement errors in earnings and cash flows, the information content of cash flows is maintained conditional on the information content of earnings.[19]

### *4.2. Sensitivity analysis*[20]

A number of additional tests have been carried out in order to examine the stability of the results reported above:

1. A 12-month return window following the financial year and a 12-month return window finishing six months after the financial year-end have been examined. In addition, NI has been replaced by net income before extraordinary items. None of these changes affects the results reported above.
2. When all observations are included in the regression the results remain similar to the results reported above using a restricted sample. Only the coefficient on CFO decreases slightly. Thus, the results reported above are not affected by the exclusion of biased cash flow measures.
3. Bernard's (1987) analysis suggests that cross-sectional correlation in the residual terms is more severe in studies applying long return windows (e.g. one year). In order to assess the impact of cross-sectional correlation in this study, a randomisation procedure similar to the one outlined in Noreen (1989) and used by Ali and Hwang (1994) is applied. Randomisation assesses statistical significance by comparing observed values of statistics with empirical sampling distributions based on repeated 'shufflings' of the original data. The dependent

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[17] Additional tests below will address these deficiencies.

[18] Since changes and levels is the appropriate specification for one year return windows, the use of only a level specification in Table 5 will affect the F-test on the cash flow variables. The results should therefore be interpreted cautiously. I thank one of the anonymous referees for pointing this out.

[19] Obviously, return windows of up to four years do not control perfectly for measurement errors in earnings and cash flows. For example most investments in tangible assets are likely to last for more than four years. Consequently, longer return intervals are needed to obtain a better control for measurement errors in earnings and cash flows.

[20] The results reported in the sensitivity analysis may be obtained on application to the author.

**Table 4**

**Incremental information content of Danish cash flows beyond Danish earnings (NI) - deleted sample**

**Model**[a]: $R_{it} = \alpha_{0t} + \beta_{1t}(\Delta NI_{it}/P_{it-1}) + \beta_{2t}(NI_{it}/P_{it-1}) + \beta_{3t}(\Delta WCFO_{it}/P_{it-1}) + \beta_{4t}(WCFO_{it}/P_{it-1}) + \beta_{5t}(\Delta CFO_{it}/P_{it-1}) + \beta_{6t}(CFO_{it}/P_{it-1}) + \beta_{7t}(\Delta CFAI_{it}/P_{it-1}) + \beta_{8t}(CFAI_{it}/P_{it-1}) + \beta_{9t}(\Delta NCF_{it}/P_{it-1}) + \beta_{10t}(NCF_{it}/P_{it-1})$

| Year | $\beta_0$ | $\beta_{1\Delta NI}$ | $\beta_{2NI}$ | $\beta_1+\beta_2$ | $\beta_{3\Delta WCFO}$ | $\beta_{4WCFO}$ | $\beta_3+\beta_4$ | $\beta_{5\Delta CFO}$ | $\beta_{6CFO}$ | $\beta_5+\beta_6$ | $\beta_{7\Delta CFAI}$ | $\beta_{8CFAI}$ | $\beta_7+\beta_8$ | $\beta_{9\Delta NCF}$ | $\beta_{10NCF}$ | $\beta_9+\beta_{10}$ | Adj $R^2$ | F-ratios[b] | N[c] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Annual cross-sectional regressions:** | | | | | | | | | | | | | | | | | | | |
| 1985 | 0.06<br>(0.4)[d] | 2.96<br>(1.9) | 3.66<br>(2.9)*** | 6.62<br>(8.3)*** | -0.83<br>(-1.0) | 0.53<br>(0.7) | -0.30<br>(0.7) | 0.27<br>(-0.4) | -0.13<br>(0.3) | -0.14<br>(-0.5) | -0.14<br>(-0.3) | -0.10<br>(0.3) | -0.24<br>(0.5) | 0.20<br>0.3 | 0.13***<br>(0.9) | 0.33 | 51.0 | 5.2*** | 41 |
| 1986 | -0.05<br>(-0.5) | 4.00<br>(3.3)*** | -1.16<br>(-0.8) | 2.84<br>(6.1) | -1.19<br>(-2.0) | 0.40<br>(0.6) | -0.79<br>(1.9) | 1.53<br>(2.8)*** | -0.37<br>(-1.0) | 1.16<br>(5.0)** | -0.96<br>(-2.9) | 0.29<br>(0.8) | -0.67<br>(6.6) | 0.21<br>(0.8) | -0.64***<br>(6.6)*** | -0.43<br>(0.8) | 30.6<br>(-1.5) | 3.9***<br>(1.2) | 51 |
| 1987 | -0.14<br>(-0.5) | -0.14<br>(-0.05) | 1.00<br>(2.6) | 0.86<br>(2.0) | 0.14<br>(0.4) | -0.33<br>(-0.6) | -0.19<br>(0.2) | -0.22<br>(-1.6) | 0.54<br>(2.5) | 0.32<br>(1.8) | -0.18<br>(-2.3)** | 0.03<br>(0.8) | -0.15<br>(1.7) | 0.30<br>(2.7) | -0.35***<br>(-2.8)*** | -0.05<br>(2.0) | 44.7 | 2.3** | 66 |
| 1988 | 0.38<br>(5.0)*** | -0.15<br>(-0.3) | -0.05<br>(0.1) | -0.20<br>(0.1) | 1.44<br>(2.4)*** | 0.38<br>(0.7) | 1.82<br>(6.0)*** | 0.25<br>(0.6) | 0.06<br>(0.1) | 0.31<br>(0.8) | -0.13<br>(-0.8) | 0.11<br>(0.4) | -0.02<br>(0.4) | 0.03<br>(0.2) | 0.15***<br>(0.5)*** | 0.18<br>(0.7) | 41.5 | 7.5*** | 83 |
| 1989 | 0.14<br>(2.0)** | -1.15<br>(-2.4)*** | 0.73<br>(0.9) | -0.42<br>(1.9) | 1.19<br>(2.7)*** | 0.68<br>(1.0) | 1.87<br>(11.6)*** | -0.24<br>(-1.0) | -0.34<br>(-0.8) | -0.58<br>(1.5) | 0.37<br>(2.3)** | 0.06<br>(0.3) | 0.43<br>(4.7)** | -0.32<br>(-1.7)*** | 0.68***<br>(1.9)*** | 0.36<br>(2.0) | 27.7 | 5.5*** | 79 |
| 1990 | -0.08<br>(-2.1)** | 0.10<br>(0.2) | 0.42<br>(0.7) | 0.52<br>(0.6) | -0.11<br>(-0.3) | 0.43<br>(1.1) | 0.32<br>(0.7) | 0.02<br>(0.1) | -0.14<br>(-0.6) | -0.12<br>(0.4) | 0.06<br>(0.7) | -0.10<br>(-0.7) | -0.04<br>(0.4) | 0.16<br>(0.7) | 0.20***<br>(0.6) | 0.36<br>(4.3)** | 13.6 | 2.4** | 75 |
| 1991 | -0.11<br>(-2.6)*** | -0.10<br>(-0.2) | 0.11<br>(-0.3) | -0.01<br>(0.2) | -0.10<br>(2.1)** | 0.77<br>(-0.3) | 0.67<br>(2.1) | 0.24<br>(1.2) | -0.22<br>(-1.0) | 0.02<br>(0.8) | -0.27<br>(-3.0)*** | 0.01<br>(0.1) | -0.26<br>(4.9) | 0.12<br>(1.1) | 0.51***<br>(2.9)*** | 0.63<br>(8.4)*** | 35.6 | 5.9*** | 78 |
| 1992 | 0.01<br>(0.1) | 0.38<br>(0.8) | 0.62<br>(1.7)*** | 1.00<br>(2.2) | -0.18<br>(-0.4) | 0.47<br>(0.9) | 0.29<br>(0.4) | 0.27<br>(1.0) | -0.43<br>(-1.1) | -0.16<br>(0.7) | -0.10<br>(-0.9) | 0.18<br>(1.2) | 0.08<br>(0.7) | -0.22<br>(-1.1) | 0.46***<br>(1.3)*** | 0.24<br>(0.9) | 26.8 | 3.3*** | 64 |
| **Pooled sample:** | | | | | | | | | | | | | | | | | | | |
| Ret<br>$\text{ma}_e$ | -0.05<br>(-2.0)** | -0.12<br>(-0.8) | 0.49<br>(2.2)** | 0.37<br>(4.0)*** | 0.34<br>(1.6) | 0.52<br>(2.4)*** | 0.86<br>(12.5)*** | 0.07<br>(1.0) | -0.29<br>(-2.1)** | -0.22<br>(4.1)*** | -0.03<br>-(0.8) | 0.10<br>(1.8)* | 0.07<br>(1.7) | -0.10<br>(-1.4) | 0.32***<br>(2.8)*** | 0.22<br>(8.0)*** | 21.6 | 12.5*** | 551 |
| $\text{Size}_f$ | -0.06<br>(-3.1)*** | -0.24<br>(-1.7)* | -0.25<br>(1.3) | 0.01<br>(1.8) | 0.45<br>(2.7)*** | 0.61<br>(2.5)*** | 1.06<br>(20.2)*** | 0.10<br>(1.4) | -0.32<br>(-2.5)*** | -0.22<br>(5.2)*** | -0.04<br>(-1.4) | 0.11<br>(2.0)** | 0.07<br>(2.0) | -0.07<br>(-1.1) | 0.28***<br>(2.6)*** | 0.21<br>(7.8)*** | 19.6 | 26.5*** | 551 |

a. Description of regression variables: $R_{it}$ is the raw return on a share in company$_i$ over the 12 months extending from nine months prior to the fiscal year-end and ending three months after the fiscal year-end. NI, WCFO, CFO, CFAI, NCF are the net income, the working capital from operation, the cash flow from operation, the cash flow after investments and the net cash flow respectively per share in company$_i$for the period$_t$, $P_{it-1}$ is the price per share in company$_i$ at time$_{t-1}$ and $\epsilon_{it}$ is a random distribution term assumed to be distributed $\in N(0,_\sigma)$.

b. F-ratios for $H_0$: $\beta_5+\beta_6 = \beta_7+\beta_8 = \beta_9+\beta_{10} = 0$

c. N is the number of observations in the regressions.

d. White adjusted t-statistics (F-statistics) are provided in the brackets:

* Significant at $0.05 < = \alpha < = 0.10$

** Significant at $0.01 < = \alpha < = 0.05$

*** Significant at $\alpha < = 0.01$

e. $\text{Retma}_e$ is the market-adjusted return. It is calculated by deducting the value weighted market return (total index) from the stock return of company$_i$.

f. $\text{Size}_f$ is the size-adjusted return. It is calculated by separating the companies into five portfolios based on their market value and subtracting the average stock return from each portfolio from company$_i$'s raw return.

**Table 5**

**Incremental information content of Danish cash flows beyond Danish earnings (NI) - long window - deleted sample**

**Model**[a]: $AR_{iT} = \beta_0 + \beta_1(ANI_{iT}/P_{it-1}) + \beta_2(AWCFO_{iT}/P_{it-1}) + \beta_3(ACFO_{iT}/P_{it-1}) + \beta_4(ACFAI_{iT}/P_{it-1}) + \beta_5(ANCF_{iT}/P_{it-1}) + {}_{e}{}_{iT}$

| Window | $\beta_0$ | $\beta_{1NI}$ | $\beta_{2WCFO}$ | $\beta_{3CFO}$ | $\beta_{4CFAI}$ | $\beta_{5NCF}$ | *Adjr $R^2$* | *DW*[b] | *F-ratios*[c] | N[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 Year | 0.01 | 0.52 | 0.60 | -0.12 | 0.02 | 0.20 | 22.4 | 2.2 | 6.9*** | 685 |
| | (0.6)[e] | (3.5)*** | (3.4)*** | (-1.0) | (0.4) | (3.8)*** | | | | |
| 2 Year | -0.01 | 0.59 | 0.66 | -0.22 | 0.03 | 0.20 | 32.6 | 1.5 | 5.52*** | 519 |
| | (-0.4) | (3.7)*** | (3.6)*** | (-1.7)* | (0.8) | (2.4)*** | | | | |
| 3 Year | -0.05 | 0.55 | 0.44 | -0.03 | 0.00 | 0.20 | 39.2 | 1.3 | 2.92*** | 359 |
| | (-2.2)** | (4.2)*** | (3.4)*** | (-0.3) | (0.0) | (2.5)*** | | | | |
| 4 Year | -0.06 | 0.50 | 0.57 | -0.22 | 0.00 | p 0.08 | 36.7 | 1.1 | 3.12*** | 245 |
| | (-1.0) | (4.8)*** | (4.8)*** | (-3.0)*** | (0.0) | (1.3) | | | | |

a. Description of regression variables: $AR_{iT}$ is the aggregated raw return in a share in $company_i$ over $time_{(t-1-T)}$ beginning nine months prior to the fiscal $year\text{-}end_{t-1}$ and ending three months after the fiscal year-end of $year_T$. $ANI_{iT}$, $AWCFO_{iT}$, $ACFO_{iT}$, $ACFAI_{iT}$ and $ANCF_{iT}$ are the aggregated net income, the aggregated working capital from operation, the aggregated cash flow from operation, the aggregated cash flow after investment and the aggregated net cash flow per share respectively in $company_i$ for the period(t-1-T), **P1it-1** is the price per share in $company_i$ at $time_{t-1}$ and ${}_{e}{}_{iT}$ is a random distribution term assumed to be distributed ${}_{e}N(0,_{\sigma})$.

b. DW is Durbin-Watson statistics which examine the effect of interdependence due to the use of long windows.

c. F-ratios for $H_0$: $\beta_3 = \beta_4 = \beta_5 = 0$

d. N is the number of observations in the regressions.

e. White adjusted t-statistics (F-statistics) are provided in the brackets:

* Significant at $0.05 < = \alpha < = 0.10$

** Significant at $0.01 < = \alpha < -0.05$

*** Significant at $\alpha < = 0.01$

variable is shuffled by maintaining a time-series order of observations and the structure of the independent variables. The original value of each of the coefficients is compared with estimates obtained from 100 random shuffles to obtain significant levels. The significance levels of $\beta_0$ to $\beta_{10}$ are 0.02, 0.12, 0.04, 0.01, 0.00, 0.06, 0.00, 0.12, 0.21, and 0.00 respectively.[21] These significance levels are similar to those reported in Table 4. Thus the results reported in the original tests do not seem to be affected by cross-sectional correlation in the residual terms.

4. When the incremental information content of cash flows beyond earnings is examined there seems to be some inconsistency between the results obtained in the regressions using pooled and annual data, respectively. Consequently, a specification similar to 2a is examined, the only exception being that the new specification allows the regression coefficients to vary across time. Strong and Walker (1993) and Ali and Pope (1995) show that the explanatory power of the earnings-returns model and the cash flow-returns model each increases when the regression coefficients are allowed to vary across time. Allowing for time-varying parameters in the pooled regression increases the explanatory power. However, the coefficients on the accrual and cash flow-based variables remain similar to the coefficients on the accrual and cash flow-based variables obtained in the pooled regression which does not allow for time-varying parameters.
5. In order to compare the results of CFO with prior studies, a restricted model excluding NCF and CFAI is examined. This specification is similar to most prior specifications used in the cash flow literature. In a pooled regression, the coefficient on CFO remains negative but not significantly different from zero. Although the coefficient on CFO is slightly more negative when an annual cross-sectional regression is carried out, none of the yearly coefficients on CFO becomes significant at any conventional significance levels. Although the result obtained in the pooled regression is affected by the inclusion of CFAI and NCF, the results obtained in the annual regressions remain unchanged. An explanation for the difference in the pooled regression (including/excluding CFAI and NCF) is that CFO in the full model, including CFAI and NCF, represents a difference in the response coefficients on unexpected investments and current accruals, respectively. CFO in the reduced model, excluding CFAI and NCF, represents the difference in the response coefficients on unexpected cash flow from operations and current accruals, respectively (Bernard and Stober, 1989).
6. A potentially disturbing factor in the long return window is that the same observation is represented more than once in the same portfolio. The results are likely to suffer from autocorrelation in the error terms, which will bias the results. The decreasing Durbin-Watson statistic in Tables 3 and 5 indicates that this is the case. Consequently, the same observation is allowed to be represented only once in the regression. As the Durbin-Watson statistic is close to two for the new set of observations, the effect of autocorrelation has by and large been eliminated. In addition, in qualitative terms the results are the same as the results reported for the full sample and therefore support the findings where all the observations are included. These additional tests show that the results reported in this study are reliable and not caused by model specification errors.

## 8. Conclusion

Accrual-based earnings measures are superior to cash flow measures. The superiority of the accrual-based earnings measures is probably understated, given that disclosure has more or less been ignored in this study. For example, notes about the composition of sales, costs, assets and liabilities tend to increase the information content of accruals. Despite the superiority of earnings, this study finds that, for Danish firms, the aggregated effect of cash flows has incremental information content beyond that of earnings. In addition, both CFO and NCF have incremental information content beyond that of earnings. While CFO is negatively associated with the contemporaneous stock return, NCF is positively associated with it. A negative (positive) coefficient on CFO (NCF) indicates that investors respond more favourably to one dollar of current accruals (NCF) than to one dollar of investment (financing). The incremental information content of cash flows beyond earnings is maintained when longer return intervals are employed.

From a Danish policy perspective, these findings support the inclusion of a cash flow statement in Danish financial statements. Compared with prior cash flow studies using data from other countries, this study shows that it is useful to examine the information content of cash flow variables other than CFO. Further, when controlling for measurement errors in earnings and cash flows, the information content of cash flows is maintained conditional on the information content of earnings.

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[21] The significance levels reported are based on a pooled regression where size-adjusted return is used as the dependent variable. When market-adjusted return is used as the dependent variable the results remain similar to the results reported above.

This study can be extended on several dimensions. First, following the argument by Ali and Pope (1995), this study can be extended by including a US matching sample. Given the results presented in this study and given that Plenborg (1996) finds that Danish earnings seem to be relatively more informative than US earnings, it could be expected that the information content of Danish cash flows is lower than the information content of US cash flows when controlled for the information content of earnings. Second, this study uses aggregated earnings and cash flow measures. For example, finances comprise both equity and debt and investments comprise intangible, tangible and financial assets. Similar arguments can be made with respect to accruals. By aggregating these data, information might be lost as the data may offset each other. Thus, an additional test in which the accrual and cash flow performance measures are decomposed might be fruitful. Livnat and Zarowin (1990) is the only study which examines the information content of a decomposed cash flow statement.

## Appendix A

| | |
|---|---|
| Net income (NI): | Net income (after extraordinary items). |
| Comprehensive income (CI): | Book value$_t$ − Book value$_{t-1}$ − Net sale of common and preference stocks + dividends |
| WCFO | Operating income before depreciation − tax paid+extraordinary items adjusted for the proceeds from gains and losses from sales of PPE (if possible)+financial items. |
| CFO | WCFO-$_{\Delta}$inventory − $_{\Delta}$accounts receivable+$_{\Delta}$accounts payable and other accrued liabilities. |
| CFAI | CFO+net investments in intangible assets, tangible assets and financial assets. |
| NCF | Change in cash and cash equivalents[a]. |

a. The change in marketable securities from current assets has been used as a proxy for the Danish cash equivalents.

## References

Ali, A. (1994). 'The incremental information content of earnings, working capital from operation, and cash flows'. *Journal of Accounting Research,* (April): 61–74.

Ali, A. and Hwang, L. S. (1994). 'Accruals management and the incremental information content of earnings and cash flow from operations'. Working paper (May), New York University.

Ali, A. and Pope, P. (1995). 'The incremental information content of earnings, working capital from operations, and cash flow: the UK evidence'. *Journal of Business Finance and Accounting,* (January): 19–34.

Ali, A. and Zarowin, P. (1992). 'The role of earnings levels in annual earnings-returns studies'. *Journal of Accounting Research,* (Autumn): 286–296.

Andersen, L. (1996). 'KFX-aktierne populære i udlandet', *Børsen* Danish Newspaper, April 22: p. 20.

Bernard, V. L. (1987). 'Cross-sectional dependence and problems in inference in market-based accounting research'. *Journal of Accounting Research,* 25 (Spring): 1–48.

Bernard, V. and Stober, T. (1989). 'The nature and amount of information in cash flows and accruals'. *The Accounting Review,* 64 (Oct): 624–652.

Bowen, R. M., Burgstahler, D. and Daley, L. A. (1987). 'The incremental information content of accrual versus cash flows'. *The Accounting Review No. 4,* (October): 723–747.

Clubb, C. D. B. (1995). 'An empirical study of the information content of accounting earnings, funds flows and cash flows in the UK'. *Journal of Business Finance and Accounting,* 22, (January): 35–52.

Dechow, P. (1994). 'Accounting earnings and cash flow as measures of firm performance: the role of accounting accruals'. *Journal of Accounting and Economics,* 18: 3–42.

Easton, P. D. and Harris, T. S. (1991). 'Earnings as an explanatory variable for returns'. *Journal of Accounting Research* (Spring): 19–36.

Easton, P. D., Harris, T. S. and Ohlson, J. A. (1992). 'Aggregate accounting earnings can explain most of security returns'. *Journal of Accounting and Economics,* 15: 119–142.

Harris, T. S., Lang, M. and Möller, H. P. (1994). 'The value-relevance of German accounting measures: an empirical analysis'. *Journal of Accounting Research,* 32: 187–209.

Jennings, R. (1990). 'A note on interpreting "incremental information content" '. *The Accounting Review,* 65 (Oct): 925–932.

Kinnunen, J. and Niskanen, J. (1993). 'The information content of cash flows and the random walk: evidence from the Helsinki stock exchange'. *Accounting and Business Research,* 23: 263–272.

Livnat, J. and Zarowin, P. (1990). 'The incremental information content of cash flow components'. *Journal of Accounting and Economics,* 13: 25–46.

Noreen, E. W. (1989). '*Computer Intensive Methods for Testing Hypotheses*'. New York: John Wiley & Sons.

Ohlson, J. A. (1991). 'Earnings, book values, and dividends in security valuations'. Working paper (February), Columbia University.

Ohlson, J. A. and Shroff, P. (1992). 'Changes versus levels in earnings as explanatory variables for returns: some theoretical considerations'. *Journal of Accounting Research* (Autumn): 210–226.

Plenborg, T. (1996). 'The information content of accrual- and cash flow-based performance measures—from a Danish and US perspective'. Unpublished Ph.D. dissertation, Copenhagen Business School.

Rayburn, J. (1986). 'The association of operating cash flow and accruals with security returns'. *Journal of Accounting Research,* 24 (Supplement): 112–133.

Strong, N. and Walker, M. (1993). 'The explanatory power of earnings for stock returns'. *The Accounting Review,* 68 (April): 385–399.

Voung, Q. H. (1989). 'Likelihood ratio tests for model selection and non-nested hypotheses'. *Econometrica*: 307–333.

Wilson, G. P. (1987). 'The incremental information content of the accrual and funds components of earnings after controlling for earnings'. *The Accounting Review*, 62 (April): 293–322.

Wilson, G. P. (1986). 'The relative information content of accruals and cash flows: combined evidence at the earnings announcement and annual report release date'. *Journal of Accounting Research* (Supplement): 165–203.

# The relevance of owner-manager signals and risk proxies to the pricing of bank loans

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**Abstract**—This exploratory study, using a sample of 115 new bank loans to small owner-managed firms, demonstrates that a simple categorical pricing model can explain a substantial part of the variation in interest rate premia. It appears that loan term and size interact (in a categorical schema) in their association with interest rate premia. It is suggested that this is more likely a product of co-determination rather than causation. There appear to be significant categorical pricing effects attributable to human capital, industry, and collateral effects. The role of collateral remains ambiguous, although it appears that source matters as much as form. Although further testing of the model is warranted, the results generally indicate that a simple categorical model may be an appropriate representation of loan pricing for small firms and that this can be used to test the value to borrowers of investing in quality signals and information cues.

## 1. Introduction

The differential pricing of loans to owner-managed (unlisted) firms in response to owner-managers' signals[1] and categorical risk (default) proxies may have important implications for owner-managers' information gathering and other decisions. To explore the differential pricing proposition, a sample of small owner-managed firms acquiring bank loans and a stylised pricing model are used to test possible explanatory variables for observed differential loan pricing. It is emphasised that it is the *provision* of signals (information cues) per se that is of interest here rather than the content of particular signals. While this approach necessarily restricts the analysis, it facilitates a clearer focus on owner-manager signalling choices and categorical effects.

The absence of equity market effects on information supply and capital instrument pricing for closely held unlisted firms suggests debt providers must rely on the direct acquisition of information and their own evaluation of the default risk (quality) owner-managed firms. While banks can contract for the provision of particular information, enforcement and monitoring of quality are costly. Such costs and any remaining information risk should be factored into the debt pricing.

Akerlof (1970) argued that where market imperfections are sufficient to prevent buyers from adequately distinguishing product quality, higher quality products are undervalued. Akerlof's 'lemons' pricing argument suggests that lenders will price loans to compensate them for mistakenly funding defaulters. This suggestion provides the basis for a pricing model, based on the availability of information regarding loan applications from owner-managed firms, that demonstrates how owner-managers may be motivated to provide information or signals of quality to a lender.

Where a lender cannot adequately distinguish the relative qualities of owner-managed firms receiving finance, all such firms are predicted to attract similar prices for debt which will generally approach that applicable to lower quality firms. Owner managers that perceive their firms as higher quality borrowers thus have an incentive to signal their quality difference to the lender. Those that signal successfully should be charged lower interest rates than other owner-managed firms. Therefore, differing degrees of firm-specific information should affect the interest rates charged on loans.

The next section identifies the loan pricing mechanism in which levied interest rates for loans incorporate additive premia and discounts. Following a brief review of potential owner-manager signals and risk proxies in contracting for loans, the model is used to test the extent to which interest rate premia can be attributed to particular sig-

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[1] Owner-managers' signals refer to choices made or actions taken by owner-managers that may be interpreted as indicators of the quality of their firms.

nals and risk proxies for a sample of bank loans to owner-managed firms.

## 2. The pricing model

The model adopted to test the pricing impact of potential signals follows Shailer (1999) in which a lender is depicted as pricing loans at the weighted average interest rate which reflects the lender's expectation of the average default risk of a loan pool.[2] As the probability of default on any dollar in the pool increases, so does the loan price for the pool. The difference between the lender's required or notional rate of return and the levied interest rate is the default premium, which also includes expected monitoring and collection costs.

### *2.1. Signalling*

A borrower can avoid some or all of the default premium levied against the relevant loan pool by credibly signalling its quality to differentiate itself from remainder of the pool—the proportion of defaulters in the remaining pool increases[3], increasing the interest rate charged to the firms remaining in the pool.[4]

Firms that effectively signal their relative quality are assigned to different pools with different expectations of default.[5] Assuming a rational firm will not signal it is a defaulter, then the premium charged to firms signalling their superior loan quality is less than the premium charged to the non-signalling borrowers. As more firms successfully signal their relative quality, the default probability for the non-signalling residual pool may approach a level of unacceptable risk to the lender, at which stage the remaining firms may be screened out of the lending portfolio.[6] Thus, loan applicants that do not signal their quality may be rationed out of the loan market, depending on the degree of homogeneity among lenders (homogeneity may be diminished if the bank includes other premia, as described below).

This accords with the suggestion that interest rates can act as a screening device. Stiglitz and Weiss (1981) propose that banks will not always increase the interest rate they charge, even in the face of excess demand for funds, as this might lead to an unacceptably high default risk. They reason that higher interest rates reduce the proportion of low risk borrowers and may induce borrowers to take riskier actions. This view is challenged in de Meza and Webb (1987), who argue that information asymmetry can result in over-investment which can be addressed by increasing interest rates (where borrowers differ only in their *ex ante* 'success' probabilities). Thus, individual borrowers who act to reduce information asymmetry should nevertheless avoid interest rate premia regardless of generalised aggregated effects. Bester (1987) argues that banks may design contracts to entail sorting and incentive devices—particularly collateral, thus reducing the screening effect of interest rates.[7] Bester notes that, under imperfect sorting, some pooling of good and bad risks may still arise with debt rationing. The implicit subsidisation of lower quality borrowers by higher quality borrowers provides an incentive for higher quality borrowers to signal their difference.

### *2.2. Other information adjustments*

A lender may use information sourced independently of the borrower, such as historical default rates for firms at particular stages of development or in particular industry categories. The lender may then apply different premia for groups of firms to compensate for categorical risks and lending costs. The latter vary with loan size and organisational form.[8] Similar categorical treatment may apply to observable traits such as owner-manager human capital (which may, for example, increase with experience and qualifications).

### *2.3. Aggregation of premia*

The premium component of the interest rate charged for a particular loan is the sum of the various premia charged for all categorical factors relevant to the particular loan and the information supplied by the borrower:

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[2] A loan pool is a set of loans which the lender can not separate on the basis of quality.

[3] With this approach, it is assumed that the signalling does not change the lender's beliefs concerning the default rate for its total small business loans portfolio.

[4] While this stepwise determination of interest rates appears simplistic, a continuous differential ranking of loans does not accord with the observed interest rates charged to small firms. The stepped nature of quoted rates suggests groups of borrowers are priced (ranked) equally by the lender, implying multiple loan pools in which loans are assigned equal aggregate monitoring and default costs. As described later, quoted rates moved in steps of 0.25% for the period under study. Upper limits on quoted interest rates imply the existence of a maximum level of default risk that a lender will accept.

[5] Interestingly, Jaffee and Modigliani (1969) also argue (in a different context) that, in pursuing profits, a banker might try to classify borrowers into different interest rate or risk classes.

[6] As an increasing proportion of loans is identified as good, the increased premium to remaining firms provides an increasing incentive to signal their quality. If the costs of signalling are sufficiently low, then eventually only defaulters should be left in the pool. However, signalling costs and uncertainty suggest there will always be some default risk for any pool of loans.

[7] Whether this results in reduced collateral requirements or lower interest rates or both remains unresolved.

[8] This suggests not all non-signalling borrowers will be rationed out of the bank's portfolio if the other available information is sufficient to reduce the premium below the bank's screening value.

$$PREMIUM_i = r_i - r_o = \sum_{j=1}^{J} \rho_{i,j}$$

where $r_i$ = the interest rate levied on loan $i$.
$r_o$ = the benchmark rate for bank loans applicable when loan $i$ was granted.
$\rho_{i,j}$ = the premium (discount) for loan $i$ attributed to categorical factor $j$.

As the number of factors in this aggregation increase, the interest rates charged by a lender will appear more loan-specific. This construction of premia implies that, if information cues or categorical risk factors can be adequately identified, differences in premia to a portfolio of borrowers can be explained by a linear combination of premia (or discounts) attached to the various information cues. Potential classes of signals and other categorical risk factors are considered in the following sections.

## 3. Owner-managers' signals

What may constitute owner-managers' signals is vague and the information content of identified signals may be ambiguous. Signals are observed actions or choices by owner-managers that may be interpreted as indicators of the relative qualities of their firms. The extensive literature dealing with the possible information value of financial statements suggests that they may be key signalling devices. It also suggests that the value of such devices may be moderated by the involvement of (relatively) independent experts in their preparation (typified by public accountants), and the type of organisation to which they pertain. The finance literature which deals with access to and the cost of debt identifies collateral as a critical signalling or screening device, while some attention has also been given to the relevance of human capital. These various factors are discussed below. The identification of these factors may appear, to some degree, ad hoc. This study, however, provides a convenient conjunction of the somewhat separate literatures from which they have been adopted. In identifying potential factors, emphasis is on their capacity to signal categorical default risks or uncertainty. The set of factors identified here is unlikely to be exhaustive and future work that expands or refines the set may be required. Nonetheless, the prominence of the various factors in the identified literature warrants their consideration in this exploratory study.

### *3.1. The relevance of financial statements*

Many issues have been addressed in the literature concerning the perceived usefulness of financial statements to lenders and investors. The use of public accountants and a firm's adopted organisational form may influence the propensity for firms to provide financial statements or the weight given to them by lenders. The relevance of financial statements to bank lending decisions (for small or owner-managed firms) is considered in a variety of areas including financial distress models for small unlisted companies (e.g. Edminster, 1972; McNamara, Cocks and Hamilton, 1988; Shailer, 1990), the professional banking and capital-raising literature (e.g. Fenton, 1985; Barrett, 1990; Manfuso, 1996; Wright and Robbie, 1996) and studies of loan officers (e.g. Stanga and Tiller, 1983; Beaulieu, 1994).

The financial distress literature uses components of financial statements to construct classification models with varying success rates. The professional literature directs bankers' attention to the need to analyse financial statements in lending decisions, arguing that this would enable anticipation of financial difficulties. Stanga and Tiller (1983) provide survey evidence suggesting that US bank loan officers place considerable importance on financial statements when evaluating loan applications from small businesses. While they report a higher ranking of some balance sheet items in lending to small private companies compared to large public companies, for both groups the income statement appears paramount. Balance sheet information is generally rated as 'very important' while some income statement items are rated as 'extremely important'.

In comparison, Wright and Robbie (1996) provide a schema of venture capitalists' information requirements that highlights the role of financial statements in the venture capitalist's screening process. While the use of information by venture capitalists may differ substantially from that of lenders, the persistent presence of financial statements in the preferred information set reinforces expectations that their availability *per se* to lenders may have consequences for the availability or pricing of loans, regardless of the contents of the statements.

The presence or absence of financial statements is considered a signal in this analysis. Inclusion of risk proxies derived from the contents of financial statements is not pursued—to do so would preclude testing the relevance of the *provision* of the financial statements. The limitation imposed on the analysis by excluding the contents of statements depends on the importance of such risk measures.[9] The inclusion of such measures is also inconsistent with the objective of measuring the relevance of cues rather than information content.

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[9] The usefulness of such measures is not clear. Storey (1989, p. 175) suggests that factors which reflect small firm risk characteristics differ considerably from those used for large firms. Vos (1992) reports that traditional risk measures applied to (larger) listed firms (such as accounting betas) do not perform

While a balance sheet can be constructed with relative ease at any date, the provision of income statements by owner-managed firms tends to be more an annual event.[10] Income statements are less likely to be available (or meaningful) for new firms, which may induce correlation with the age of the firm.

### 3.2. *Public accountants*

The extent to which public accountants are used in preparing information for loan applications or their significance for loan pricing does not appear to have been considered. Holmes and Nicholls (1989), based on a survey of Australian small businesses, indicate that most small businesses (at least 69% of their sample) use public accountants in compiling annual financial statements.

Wright and Robbie (1996) conclude that, while financial statements are important in valuing projects and measuring returns, they are not taken at 'face value'. Unaudited 'latest period' statements were rated as at least as important as audited balance sheets. Together with listed company research regarding the effects of audit reports on lending officers' perceptions (for example, Gul, 1987), such results direct attention to how the *credibility* of financial statements for owner-managed firms may be influenced by the use of public accountants. Gul's laboratory experiment involving Singaporean bank loan officers indicates that auditors can influence the loan officers' evaluations, primarily by motivating the officers to seek more information if the auditors expressed uncertainty. It is not known, however, if loan officers attribute greater value to audited statements relative to unaudited statements. Given the findings of Wright and Robbie regarding the low rating of unaudited 'more recent information' by venture capitalists, there is no clear indication of any likely effect of having statements prepared or reviewed by public accountants.

Aside from public accountant's possible roles in compiling financial statements, borrowers' indications that they have involved a public accountant in their loan applications may provide credibility signals to the bank. Beaulieu (1994) reports that the credibility of financial information presented by borrowers enter loan officers' judgments interactively with accounting information.

### 3.3. *Organisational form*

While there is little published evidence regarding the informational relevance of organisational form, there are at least four potential informational aspects that may be relevant to loan pricing. These pertain to firms' propensities to prepare complete financial statements, a possible regulatory effect, a possible cost effect and managerial sophistication:

- In Australia incorporated firms are required (by statute) to prepare annual financial statements whereas sole proprietorships and partnerships usually are not.[11] If sole proprietorships and partnerships prepare financial statements especially to provide them to banks, they will be a relatively more costly signal than for incorporated firms. If unincorporated firms are consequently less likely to provide complete financial statements with loan applications, a systematic impact on loan pricing may induce an understatement of the importance of financial statements across all firms.
- The greater regulation of disclosures by incorporated firms suggest that lenders may derive different levels of information from their statements relative to unincorporated firms, although there is no *a priori* basis for predicting the nature of such differences.
- Evidence in Shailer (1993) and Ang et al. (1995) indicates that lenders circumvent the limited liability aspect of incorporated structures by requiring personal guarantees secured by domestic assets. While the increased contracting costs are unlikely to be large, they are relatively more significant against smaller loans.
- Adoption of more sophisticated organisational forms for owner-managed firms may indicate managerial sophistication. This does not appear to have been canvassed in the literature but, nonetheless, it is plausible in the context of signalling borrower quality.

### 3.4. *Collateral*

Bester (1985, 1987) argues that investors with low default probabilities will reveal themselves by accepting collateral requirements that would be unattractive to high risk applicants. This should induce an inverse association between collateral requirements and interest rate differentials. A difficulty with this argument arises (in markets where small borrowers are basically obliged to accept standardised loan agreements) if collateral requi-

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well when applied to small firms. Hutchinson (1987) suggests that traditional measures of risk (such as ratios and decomposition measures) may not successfully distinguish rapidly growing small firms from 'bankrupt' firms since these firms often exhibit similar characteristics. The failure prediction literature, however, suggests the information value should be high.

[10] The possibility of interim statements for management purposes may increase with the size and complexity of firms but, given the implied limitation of owner-management on firm size and complexity (see Shailer, 1999), the expected frequency of interim statements is very small.

[11] Australian income tax returns do not require lodgement of sets of financial statements, although some businesses may find it expedient to prepare them as a basis for preparing their returns.

rements and interest rate differentials both reflect default risk and so are co-determined. For example, both lower collateral requirements and lower interest rates may be imposed on borrowers identified as lower risk (consistent with the effect noted by Bester under his 'imperfect sorting and rationing' analysis). In such cases, lower collateral levels may be associated with lower risk borrowers. This may confuse attempts to distinguish loan default risk by reference to collateral provision.

Distinguishing the debt access and pricing issues, it is consistent with Bester, as well as the competing Stiglitz and Weiss (1981) and de Meza and Webb (1987) views noted earlier, that access to loans under information asymmetry may be significantly influenced by the availability of sufficient collateral. Cowling and Sugden (1995) report that full collateralisation has little effect on interest rate differences, whereas Cressy (1996b) reports interest rate margins to be a direct function of the probability of failure and an inverse function of security, consistent with collateral being used to mitigate risk to the lender.[12] There is substantial evidence that full collateralisation of loans is common for owner-managed firms (e.g. Shailer, 1993 in Australia; Keasey and Watson, 1993 in the UK; Ang et al., 1995 in the US) with numerous instances of borrowers being required to provide personal guarantees secured over domestic assets—thus moving the collateral 'off-balance sheet'.[13] This is not inconsistent with the size effect observed in Cressy (1996b) whereby small loans in the UK are less likely to be collateralised if collateral requirements are also a function of loan size.

The extent to which the price of debt is affected by variations in the *source* of collateral remains moot. There may be an interactive effort between collateral and owner-managers' signals. For example, financial statements might be more meaningful in instances where collateral is internal ('on-balance sheet')—perhaps because they better detail the nature of the collateral or help identify impairments. It is argued in Shailer (1993), in the context of the extensive use of personal guarantees and 'off-balance sheet' collateral, that the relevance of measures that ignore off-balance sheet collateral is questionable.

There are collateral costs to lenders which may discourage its use in marginal cases. Leeth and Scott (1989) claim that lenders must value and monitor collateral, pay filing fees for security registration and bear the higher administrative costs of secured debt. Chan and Kanatas (1985) predict that collateral has greater value where lenders have relatively less information, such as for newer firms. Jackson and Kronman (1979) argue that loan size should also be positively associated with the use of collateral because of reducing per-unit monitoring and administrative costs. They also argue that collateral becomes less valuable with shorter term debt because of the direct costs to borrowers of asset substitution. Leeth and Scott (1989) also argue for such an association between collateral and term because of increasing probabilities of default over time.

## 4. Other information and risk proxies

Additional to the use of financial risk measures based on financial statement items, prior research directs attention to bank-client relationships, stage of development or age, and industry as possibly associated with information levels and financial risk.

### *4.1. Time effects: bank-client relationships, stage of development and age*

A lender's access to information on a borrower's ability may increase with the time that the firm has been in business and with the length of the bank-client relationship. While a longer bank-client relationship indicates a greater opportunity for the bank to acquire information about a business and its owner-managers, the extent to which this proxy for information access explains variation in interest rate premia may be subsumed in the age of the business where information on activities predating any particular banking relationship is readily available (provided). Ando (1985)[14] reports that the probability of a loan request being granted increases significantly with the age of the business. Where rationing is not sufficient to exclude younger firms, this should result in pricing differentials based on age of the firm. Jovanovic (1982), Dunne et al. (1987), Evans (1987a, 1987b), Storey et al. (1987) and Storey (1989) all indicate that variability in firm performance and the probability of failure decrease with firm age. Firm age also may proxy for acquisition of human capital (see below) or an owner's ability and propriety, or indicate past profitability. Jovanovic (1982) and Lippman and Rumelt (1982) argue that firms' efficiencies are learnt over time, inducing an age effect.

With similar import for an age-of-business effect, Cressy (1992) argues that the characteristics of projects (rather than the ability of an owner-manager) are learnt over time. He also argues elsewhere (Cressy, 1996a) that an individual's human capital stock is (initially) increasing with age, thus indicating learning. Cressy (1996b) argues longer surviving businesses should attract lower margins due to increased human capital and security (through asset growth).[15]

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[12] Calomiris and Hubbard (1990) provide an interesting analysis of the role of collateral in discriminating between borrowers but ignore banks' varying degrees of information asymmetry across borrowers within an asymmetric market.

[13] The widespread use of full collateralisation appears to be a persuasive indicator of problems in observability (moral hazard).

[14] As cited in Evans and Jovanovic (1989).

A similar effect may prevail where the financing is provided to a business started by the current owner-manager versus a business purchased as a going-concern. The age or stage of development effect suggests established going concerns offer less risk to lenders and that both the owner-manager and lender have greater information as to the level and stability of income from the firm. A lender may be more willing to finance the acquisition of a going concern or provide incremental finance to an ongoing older firm than they would be to finance a new start-up or provide incremental finance to a firm established by the current owner-manager (although the latter start-up effect should reduce with the age of the business). New start-ups may embody greater uncertainty as to the viability of the project or the ability of the owner-manager. An older firm started by the current owner-manager (distinct from a *new* start-up) also may have greater uncertainty than a purchased going concern because the separability of the business from the owner-manager (and thus the saleability of the business as a going concern) is less evident. Bates (1990) similarly suggests that if managerial uncertainty typifies start-ups, then new owners may reduce uncertainty (and failure risk) by buying businesses where managerial procedures of previous owners are embedded in the business.

This also has implications for the potential role of human capital, which is considered below. The literature describing debt rationing to start-ups is questioned in Cressy (1996a), who relates rationing to human capital stocks and decisions by owner-managers to take-up debt offers.

### 4.2. *Human capital*

In keeping with the proposition in human capital theory an individual's stock of skills and abilities is an important determinant of income distribution (see Becker, 1975); Chandler and Jansen (1992) show that experience is positively related to firm performance. The proposition that human capital is positively related to the survival prospects of a firm is persuasively argued in Cressy (1996a). Cressy describes the returns (utility) achieved from the stock of human capital (of owner-managers) invested in the business to be greater than that attainable from other employment, and that this stock increases with an individual's experience. This then motivates the owner-manager to invest more effort in promoting the survival of the business. Cressy tests this notion by using the number, age, experience and education of owner-managers as measures of human capital. He reports that firms self-select for bank financing on the basis of the owner-managers' human capital and that collateral assets play little or no role in the lending process. This appears to conflict with the role of collateral identified in previous studies, but is consistent with findings regarding the association between access to finance and ages of individuals or their businesses. It also suggests that access to balance sheets will be less relevant if their function is to describe asset structures.

The potential role of human capital is rendered ambiguous by the asset specificity problem that it may engender. This is briefly considered in Pua and Shailer (1998), where it is argued that a high degree of specificity in the human capital held by a firm raise the cost of capital. This is exacerbated where the human capital pertains to the owner-manager because this diminishes the saleability of the business as a going concern. Such an effect should be less likely where secured collateral is primarily non-productive (as in the case of domestic assets), or is of a lower specificity (as in the case of much commercial real estate).

### 4.3. *Loan size*

As suggested above in the context of contracting costs and organisational form, loan size may have a scale economy effect on the interest rate charged by spreading the relatively fixed costs of a loan (such as contracting and expected monitoring costs) over a larger principal. Following Cressy (1996b), who indicates that collateralisation is less likely with smaller loans, the scale effect may also reflect increased risk attached to smaller non-collateralised loans.[16] Both effects indicate that there should be a negative correlation between loan size and premiums. As noted above, the sizes of approved loans may be highly correlated with collateral and interest rate premia if size also reflects the lender's evaluation of borrower's prospects[17] and the lender's costs of collateral.

### 4.4. *Industry*

It has long been accepted that, because they produce broadly similar end products and use similar inputs and technologies, firms in similar industries

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[15] Petersen and Rajan (1994) argue that a lender will perceive a borrower as less risky if their past experience (or the observable experiences of other lenders) with loan servicing by the borrower is positive, thus reducing the expected costs of lending to older firms. However, the empirical analysis they present does not support the proposition that bank-client relationships affect interest rates.

[16] Cressy (1996b) reports a significant relationship between size (of overdraft) and interest rates.

[17] Co-determination of interest rate premia and loan size is considered empirically below.

**Table 1**
**Interest rate premia - descriptive statistics**

| | |
|---|---|
| Minimum | −0.0100 |
| Maximum | 0.0575 |
| Mean | 0.0169 |
| Median | 0.0150 |
| Standard deviation | 0.0137 |

are expected to have broadly similar business risk and volatility of earnings (Scott, 1972; Scott and Martin, 1976; Ferri and Jones, 1979). It is reasonable, therefore, that a lender's knowledge of industry prospects and default rates for particular industries will be used in evaluating individual loans. Lenders also may incur different costs in evaluating and monitoring loans to different industries. This may reflect the lender's idiosyncratic information and the technical and economic complexity of particular industries. It may also affect the impact of information cues or other risk proxies. In particular, industry may influence human capital levels, the nature and availability of collateral, and loan size.

## 5. Empirical analysis

The categorical (pool) debt pricing model is used to test the hypothesised signals and risk proxies in a regression of the interest rate premia determined for new loans. The initial formulation does not allow for interactions, such as those pertaining to the moderating effects of industry, the credibility of financial statements involving the use of accountants, and age or origin of the business. These are considered as refinements in developing a more effective model following testing of the initial model.

### *5.1. Data*

Limited access was obtained to the files of ongoing clients[18] of two substantial branches and all the loan recovery files of a medium sized Australian bank in metropolitan Adelaide. The data collected included, where available, whether financial statements were provided with the loan application, ownership and management details, industry identification and limited data on the individual owner-managers. To ensure a reasonably homogenous debt type, the sample is limited to loans with fixed terms[19] and floating interest rates.

Excluding 176 of 291 cases of new borrowing where loan details or ownership details were incomplete, data was obtained for 115 loans issued to owner-managed firms during 1987–89. This was a period of reasonly high interest rates in Australia, allowing potentially greater variability in interest rate differentials charged to individual borrowers. Representativeness of the data and resultant generalisability beyond Australia cannot be tested, but the level of international consistency in results discussed above (for studies addressing financial distress, circumvention of limited liability and provision of collateral) suggest this is unlikely to be a major issue.

### *5.2. The response variable*

Separate indicator rates (determined from a survey of the major banks) are published each month by the Reserve Bank of Australia for bank finance below and above $100,000. The dependent variable, *PREMIUM*, is calculated as the difference between the rate charged to individual firms and the nominal base rate indicated by the Reserve Bank:

$$PREMIUM_i = r_i - r_b$$

where $r_i$ = the interest levied on loan *i*.
$r_b$ = the benchmark rate for bank loans applicable when loan *i* was granted.

The available data yields the premia described in Table 1. The range of premia is reasonably large (0.0675) with mild positive skew. No adjustments are imposed on the distribution of premium, its degree of non-normality being relatively modest.

### *5.3. Owner-manager signals and risk proxies*

The data obtained pertaining to owner-managers' signals and risk proxies are described below.

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[18] The clients were in the 'retail' area of the bank's operations which deals with small business lending. The other primary lending division is 'corporate services' which lends primarily to large and medium companies. It was a condition of access that the bank not be identified.

[19] The fixed term loan required repayment of principal and interest in equal instalments over the specified term.

**Table 2**

**Source of collateral (real estate v. non-real estate) or security by organisational form**

| *Source type of collateral* | *Sole-trader* | *Partnership* | *Company* | *Trust* | *Total* |
|---|---|---|---|---|---|
| Balance sheet—real estate | 3 | 9 | 5 | 2 | 19 |
| Balance sheet—non-real estate | 4 | 11 | 25 | 13 | 53 |
| Total balance sheet security[1] | 7 | 15 | 29 | 15 | 66 |
| Owner-manager—unsecured[2] | [12] | [21] | 1 | 2 | 3 |
| Owner-manager—real estate | 5 | 15 | 29 | 9 | 57 |
| Owner-manager—non-real estate | - | - | 5 | 2 | 7 |
| Total owner-manager security[1] | 5 | 5 | 34 | 13 | - |
| Third party—unsecured | 2 | 3 | - | - | 5 |
| Third party—real estate | 1 | - | 6 | 1 | 8 |
| Third party—non-real estate | 1 | 1 | 3 | 1 | 6 |
| Total third party security[1] | 4 | 4 | 9 | 2 | 19 |

*Notes:* 1. Cell values may exceed totals because of coincidence of types of collateral on a single loan.
2. Unincorporated firms are implicitly owner-manager guaranteed. Numbers in brackets are included notionally but omitted from totals.

*Financial statements*: With no *a priori* reasoning regarding the relative importance of income statements and balance sheet, the provision of complete income statements (*PL*) and balance sheets (*BS*) are coded separately. The provision of statements is expected to be negatively associated with the interest rate premium. Sixty (52%) loan applicants provided income statements and 56 (49%) provided balance sheets of which 51 (44% of the sample) provided both. Budgets were provided in 66 cases (57%)—of these, nine also provided either a balance sheet or income statement, while 32 provided both.

*Accountant*: The identified use of a public accountant is potentially a weak variable in that the failure to identify a public accountant in the bank loan file does not necessarily mean that one was not used and existence does not indicate the particular role of the accountant for the firm concerned. Forty seven loan applications (41%) identified a public accountant. In 12 of these cases, no financial statements were provided. Of the remaining 35 cases, all provided budgets and 27 provided both balance sheets and income statements.

*Organisational form*: The business entities comprise 42 companies, 20 trusts, 17 soletraders and 36 *nominal* partnerships. Fifteen of the nominal partnerships had only one effective owner-manager;[20] the remaining 21 *effective* partnerships are flagged by the additional dummy variable *REALPART*. The dummy variable *INCORP* is also included to distinguish incorporated entities (companies and trusts[21]) from unincorporated entities (sole-traders and partnerships).

## 5.3. *Collateral*

Most loans (93 cases or 81%) were fully collateralised by registered security but, as described later, the frequency varied with loan size. In most cases of secured loans (73 cases or 78%) the collateral included a mortgage over real estate. There were 53 cases of registered charges over on-balance sheet assets other than real estate, of which 20 were the sole form of security. There were 47 personal guarantees for loans to incorporated borrowers (76%) and 19 third party guarantees for loans (11 incorporated and eight unincorporated cases). There were 47 personal guarantees by owner-managers of incorporated firms, of which 10 coincided with third party guarantees. Unincorporated firms have owner-manager guarantees by definition.

A breakdown of guarantees and collateral sources by organisational form is given in Table 2. This describes three sources of real estate mortgage collateral: those pertaining to on-balance sheet real estate of the business, real estate owned by an owner-manager and that owned by a third party. By definition, the last two only (but not necessarily) arise in support of guarantees. Seven (64%) of the eight third party and 37 (79%) of the

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[20] This is based on bank file information which showed that the business effectively operated as a sole trader. The other partner was usually a spouse, suggesting income splitting arrangements for tax purposes.

[21] Because all trusts in the sample used companies as trustees they are treated as incorporated.

**Table 3**
**Sample by origin of business and age of firm**

| | *Current owner started business or purchased as going concern* | | |
|---|---|---|---|
| *Age category* | *Going concern* | *Start-up* | *Not known* |
| Unknown | 1 | 1 | - |
| Less than 1 year | 10 | 8 | 13 |
| >1–2 years | 9 | 7 | 7 |
| >2–3 years | 7 | 7 | 1 |
| >3–5 years | 5 | 9 | 4 |
| >5–<10 years | 3 | 3 | 5 |
| 10+years | 1 | 7 | 1 |

47 owner-manager guarantees for incorporated firms were supported by mortgages over real estate. Only one of the eight third party guarantees for unincorporated firms was supported by a mortgage over real estate with 20 mortgages for owner-manager real estate for the 53 unincorporated cases (38%).

Because there may be different cost or risk connotations in cases where multiple forms of security were taken, variables for collateral complexity were developed, based on a simple index of the different collateral sources from the types listed in Table 2. The theoretical score is six balance sheet, owner-manager, and third party by real estate and other assets), but no case scored above three. In addition to categorical variables for the four individual index values of 0–3 (22, 44, 38 and 10 cases respectively), a dichotomous variable was included to denote multiple sources (48 cases).

### 5.5. *Risk and cost proxies*

*Human capital*: Proxies for human capital proposed by Cressy (1996a), such as owner-manager age, experience and qualifications, generally were not available for a sufficiently large proportion of the sample. The number of owner-managers were identified. Combined with the age of the firm and industry, this may capture some human capital effects but is expected to be generally noisy. Overall, there are 59 cases with one owner-manager, 52 cases with two owner-managers and just four cases with three owner-managers. These are coded as one categorical variable (*OM*) where 0 denotes a single owner-manager and 1 denotes multiple owner-managers.

*Firm age and origin*: Age of the firm (*AGE*) is expected to be negatively correlated with the premium date due to either increased human capital or reduced uncertainty as to owner-manager ability or commercial prospects. The average age of the firms at the time of applying for the loans is approximately three years (data on age is in months). Half the sample are two years old or less, and 27% are one year old or less. Less than 8% are 10 years old or more. Variables were included in the analyses to flag age categories for less than one year, less than two years, two to five years, and five or more years.

Most borrowers are identified according to whether the businesses were established by the current owner-manager (44 start-ups) or were purchased as going concern (37). The origin of the business underlying 34 loans could not be identified which reduces the likelihood of this categorisation making a significant contribution in a regression. Rather than deleting missing observations for one dichotomous variable, two classificatory variables (*STARTUP* and *PURCHASE*) were scored 0 if the description did not apply or was not known. Their relevance is likely to be affected by the age of the firm. Table 3 describes the sample by origin and age. It indicates that purchased businesses cluster more in the younger ranks relative to the more rectangular age distribution of those started up by the current owner-managers.

*Industry* ($IND_i$): Industry groupings for loans were limited to four categories: 64 wholesale and retail merchants ($IND_1$); 23 leisure and tourism ($IND_2$); 20 services ($IND_3$); and 11 construction and property-related businesses ($IND_4$). The last two are the least homogenous groups but further disaggregation of these groups induces unacceptably small cell counts.[22]

*Loan size* (LOAN): Loan sizes are widely dispersed (minimum $4,850; maximum $2,700,000)[23] but generally small, with a median of $44,000. The premium model indicates that the effect of loan size should be in relation to cut-off values for loans to establish categorical effects. Without specific knowledge of the bank's size criteria, possible cut-offs to generate loan size categorical variables were sought by looking for clustering in the distribution of loan sizes. The distribution of loan sizes is generally lumpy.[24] With no clear pattern emerging in loan size, cut-offs of $25,000, $50,000 and $100,000 provide useful loan size categories with sample sizes of 29 ($1–24,999), 34 ($25–49,999), 32 ($50–99,999) and 20 ($100,000 or more).

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[22] Merchants dominate the sample but tests of the results involving disaggregation between wholesale and retail or types of merchants did not enhance the analysis.

[23] The $2.7m loan is substantially larger than the second largest ($350,000). When it is excluded, the mean falls from $83,193 to $60,238. However, other than its magnitude, there is no obvious characteristic to this loan that would justify its exclusion. Nonetheless, results are tested for any leverage it may exert.

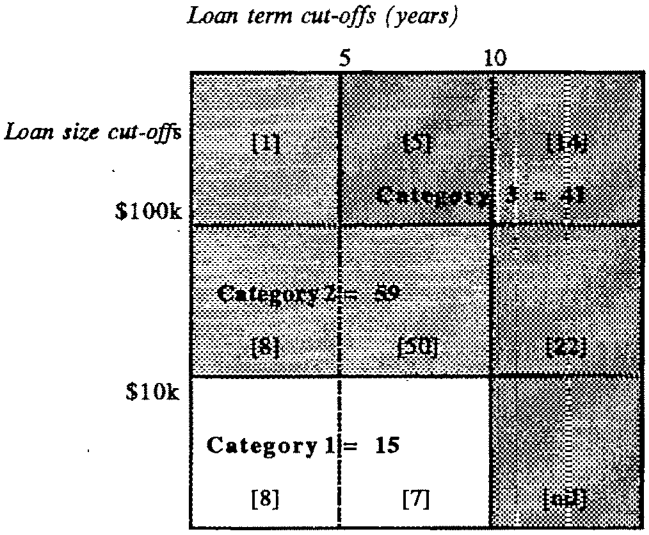
*Loan term* (*TERM*): The distribution of the terms of the loans is particularly lumpy with five, seven and 10 years accounting for 26%, 17% and 21% of loans respectively. The mean term is 7.4 years and the median is six years. As with loan size, term is also considered categorically with a variety of cut-offs tested against *PREMIUM*.

### *5.6. Associations among variables*

Strong positive associations between loan size and loan term are expected but the Pearsonian correlation coefficient is insignificant (coefficient = 0.16, $p = 0.085$). When loan size categories are considered, *TERM* has a seemingly strong pattern of increasing means as loan size increases. This is roughly represented in Figure 1, which shows some clustering. All loans up $10,000 are less than 10 years with 68% under five years. Most loans (100) under this schema are in the range $30,000–99,999 of which 59 are less than 10 years. For the largest loan category ($100,000+), 14 (70%) have terms of 10 years or more. This schedule is used as the basis of a three-way categorisation of loans based on size and term (labelled *SIZE.TERM*), as indicated by the shading of the Figure 1 cells. Category 1 is all loans up to and including $10,000 (15 cases), Category 3 is all loans of $100,000 or more with terms of five years or more (41) and Category 2 is the remainder (59). The ordering of the groups is substantiated by their means scores for the loan premiums, being 0.025, 0.019 and 0.011 (significant at $p = 0.05$) for 1, 2 and 3 respectively.

Collateralisation is also associated with size on a categorical basis. Loans are secured for 66% of those under $25,000, 77% of loans in the $25–49,999 range, 88% of the $50–99,999 range and 100% of loans of $100,000 or more. The provision of a balance sheet appears to be related to whether or not collateral was involved, although this is weaker than might be expected. Of the 66 cases of on-balance sheet security, 37 (56%) provided a balance sheet, compared to 19 of the 49 cases (39%) that did not provide a balance sheet. The behaviour does not appear different when the types of on-balance sheet security (31 balance sheets of 56 cases of real estate versus 11 balance

**Figure 1**
**Categorisation of loans by size and term (*TERM.SIZE*)**



*[n] denotes number of cases in sub-regions of categories*

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[24] Values of $10,000, $15,000, $25,000, $30,000, $40,000, $50,000, $60,000, $65,000 and $100,000 each have frequencies of 5–8 cases and overall account for 47% of the sample.

sheets of 22 cases of non-real estate[25]) is considered. The mean premium for cases providing balance sheets with on-balance sheet secured collateral is 0.0123 (real estate security) and 0.0146 (non-real estate security) compared to 0.0081 and 0.0189 respectively if no balance sheet was provided.[26] As might be expected, there is some association between the provision of balance sheets, income statements and budgets with the use of an accountant (0.25, 0.21 and 0.31 respectively). The high correlation between the provision of income statements and balance sheets (derived from 43% of cases) does not flow over to budgets—only 27% provided all three statements.

There is a noticeable age bias for $IND_2$, with nearly half (11 out of 23 cases) being less than one year old compared to 22% for the remainder of the sample; this induces some of the observed association of $IND_2$ with the absence of income statements (17 cases).

### 5.7. *Regression technique*

A major issue in selecting the regression approach is the possibility of collinearity arising from the inclusion of highly correlated explanatory variables in a regression. While this can most easily be avoided by excluding one of the correlates from the regression, the choice of which variable to exclude is particularly contentious in the absence of strong *a priori* reasoning. To merely include numerous potential interaction variables may considerably reduce degrees of freedom and add unnecessary noise. The adopted approach, therefore, uses both interaction terms (selectively) and stepwise regression procedures. The use of stepwise regression reduces the likelihood of collinearity problems due to the opportunity to specify tolerance levels for the inclusion of variables at each step.[27]

The interaction terms considered for inclusion in the various models are listed in Table 4. The list is generally larger than would be suggested by the bivariate correlations, as all organisation forms and industry categories have been considered when only one of them may have revealed a possible association with another variable. These terms will be considered where relevant in discussion of the regressions results.

### 5.8. *Regression results*

The details of each of the regression models developed here are presented in Table 5. The initial model includes dichotomous categorisation variables for the provision of a balance sheet, income statement or budget, the identification of a public accountant, borrowing firm age (four dummies denoting age categories for 1–2, 2–3, 3–5 and 5+ years), industry (three non-merchandiser categories $IND_{2\text{–}4}$), organisational form (PARTNERSHIP, REALPART, COMPANY, TRUST), pur-

**Table 4**
**Multiplicative terms included in experimental variable list**

| | Industry categories | Origin | Financial statements (BS only, PL only, BS&PL) | Budget | Organisational form | Collateral categories |
|---|---|---|---|---|---|---|
| Age categories | X | X | X | | | |
| Accountant | X | | X | X | X | |
| No. of owner-managers | X | | X | X | X | |
| Industry categories | | X | X | X | X | X |
| Financial statements (BS only, PL only, both BS & PL) | | | | X | X | X |
| Budget | | | | | X | |
| Organisational form | | | | | | X |

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[25] There are nine cases where both real estate and non-real estate on-balance sheet security is provided. A further complication are the 37 cases where both on-balance sheet and off-balance sheet collateral are provided. If these are considered separately, cell sizes are too small for analysis.

[26] These differences are not significant based on a Mann–Whitney U Test. This is not unexpected given the relatively small sample sizes. As a control comparison, the mean premiums were 0.0195 (with balance sheet) and 0.0193 (without balance sheet) for those not providing on-balance sheet collateral (regardless of any other security provided).

[27] The use of stepwise regressions also means the choice of variables in any estimated model is achieved on statistical rather than a theoretical basis, but given the range of variables that can be considered and the lack of any strong theoretical basis for preferring particular proxies over others, this does not appear to be a disadvantage. The tolerance levels used here for the inclusion of variables at each step is set at 0.1. In addition to satisfying the tolerance limit, a variable is added and retained only if the coefficient is sufficiently significant. Given that this study is largely exploratory, a relatively low confidence level of 90% ($p \leq 0.10$) is used.

**Table 5**
**Regression results**

| | *Forced entry models* | | | | *Stepwise variable selection models* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Model fit* | *1* | | *2* | | *3a* | | *3b* | | *4* | | *5* | |
| Multiple R | 0.49 | | 0.49 | | 0.43 | | 0.42 | | 0.54 | | 0.66 | |
| Adjusted $R^2$ | 0.09 | | 0.10 | | 0.16 | | 0.16 | | 0.25 | | 0.37 | |
| Anova: F stat | 1.61 | | 1.71 | | 8.20 | | 12.15 | | 6.36 | | 6.67 | |
| sig | 0.07 | | 0.05 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | |
| *Variables:* | *B* | *sig* | *B* | *sig* | *B* | *sig* | *B* | *sig* | *B* | *sig* | *B* | *sig* |
| CONSTANT | 0.040 | 0.00 | 0.040 | 0.00 | 0.038 | 0.00 | 0.03 | 0.00 | 0.02 | 0.00 | 0.018 | 0.00 |
| ACCT | −0.003 | 0.28 | −0.003 | 0.30 | | | | | | | | |
| OM | 0.003 | 0.37 | 0.003 | 0.40 | | | | | | | | |
| PURCHASED | −0.001 | 0.27 | −0.001 | 0.27 | | | | | | | | |
| *Age categories* | | | | | | | | | | | | |
| $AGE_{1-2}$ | −0.003 | 0.42 | −0.003 | 0.40 | | | | | | | | |
| $AGE_{2-3}$ | −0.001 | 0.87 | −0.001 | 0.83 | | | | | | | | |
| $AGE_{3-5}$ | −0.001 | 0.73 | −0.001 | 0.72 | | | | | | | | |
| $AGE_{5+}$ | −0.004 | 0.39 | −0.004 | 0.33 | | | | | | | | |
| *Industry* | | | | | | | | | | | | |
| $IND_2$ | 0.004 | 0.31 | 0.004 | 0.31 | | | | | 0.007 | 0.02 | | |
| $IND_3$ | 0.003 | 0.45 | 0.003 | 0.44 | | | | | | | | |
| $IND_4$ | −0.004 | 0.45 | −0.003 | 0.49 | | | | | | | | |
| *Financial statements* | | | | | | | | | | | | |
| BS | 0.001 | 0.78 | 0.001 | 0.72 | | | | | | | | |
| PL | −0.001 | 0.77 | −0.001 | 0.73 | | | | | | | | |
| BUDGET | 0.003 | 0.32 | 0.003 | 0.31 | | | | | 0.004 | 0.06 | | |
| *Organisational form* | | | | | | | | | | | | |
| SOLETRADER | | | | | | | 0.010 | 0.01 | 0.008 | 0.02 | 0.019 | 0.00 |
| PARTNERSHIP | −0.009 | 0.10 | −0.009 | 0.10 | −0.009 | 0.03 | | | | | | |
| REALPART | −0.002 | 0.75 | −0.002 | 0.79 | | | | | | | 0.007 | 0.03 |
| CO | −0.010 | 0.03 | | | | | | | | | | |
| TRUST | −0.011 | 0.05 | | | | | | | | | | |
| INCORP | | | −0.010 | 0.03 | −0.010 | 0.00 | | | | | | |
| TERM.SIZE | −0.007 | 0.00 | −0.007 | 0.00 | −0.006 | 0.00 | −0.006 | 0.00 | −0.005 | 0.02 | −0.004 | 0.04 |
| *Collateral* | | | | | | | | | | | | |
| COLLATERAL | 0.001 | 0.81 | 0.001 | 0.83 | | | | | | | | |
| OMGT.INC | | | | | | | | | −0.005 | 0.05 | | |
| 3PGT | | | | | | | | | 0.006 | 0.06 | 0.005 | 0.09 |
| BS.RE | | | | | | | | | −0.009 | 0.01 | −0.010 | 0.00 |
| *Interactions* | | | | | | | | | | | | |
| ACCT × SOLETRADER | | | | | | | | | | | −0.019 | 0.01 |
| BS × PARTNERSHIP | | | | | | | | | | | 0.011 | 0.00 |
| BUDGET × INCORP | | | | | | | | | | | 0.007 | 0.01 |
| $OM_{2+} \times IND_3$ | | | | | | | | | | | 0.016 | 0.00 |
| $SOLETRADER \times IND_1$ | | | | | | | | | | | 0.013 | 0.05 |
| $AGE_3 \times IND_3$ | | | | | | | | | | | −0.014 | 0.00 |
| $AGE_1 \times IND_2$ | | | | | | | | | | | 0.007 | 0.06 |

chased business (to distinguish from owner-manager start-ups), multiple owner-managers, collateralised (secured) loans and SIZE.TERM that orders 3 categorises loans by size and fixed term described above.

The forced regression for all these variables (model 1 in Table 5) involves considerable inefficiency. The only variables with significant coefficients are *SIZE.TERM* (which is premium decreasing, as expected), *COMPANY* and *TRUST* (also premium decreasing) and the power of the model is very low with an adjusted $R^2$ of 0.09 and a weak *F* statistic (1.6, significant at 0.07). When the regression is repeated but substituting *INCORP* for *CO* and *TRUST* (model 2), the reduced model strengthens slightly (adjusted $R^2$ is 0.10 and *F* statistic is 1.7 significant at 0.05).

When the same variables are considered for selection into a regression on a stepwise basis (model 3a), *SIZE.TERM*, *PARTNERSHIP* and *INCORP* are the only variables included and produce an $R^2$ of 0.16 (with an *F* statistic of 8.2 significant at 0.0001). Note that an $R^2$ of 0.12 is obtained from a regression on *SIZE.TERM* alone. The similarity of the coefficients for *PARTNERSHIP* and *INCORP* prompted their replacement by *SOLETRADER* (their reciprocal) with a slight improvement in efficiency in model 3b ($R^2$ of 0.16 with an *F* statistic of 12.2 significant at 0.0000).

When further categorisation of collateral and guarantees is considered, a more complex model begins to emerge. Testing dummies for each of the various sources of collateral and the various collateral index scores described above yields model 4 ($R^2$ of 0.25) with seven variables. The provision of owner-manager guarantees for incorporated firms (*OMPGT.INC*) and on-balance sheet real estate collateral (*BS.RE*) join *SIZE.TERM* as premium decreasing categories while $IND_2$ (leisure and tourism), third party guarantees (*3*PGT), and the provision of a budget join *SOLETRADER* as premium increasing categories.

The final step in exploring the potential of the variables is consideration of the interactive categories identified in Table 4. To reduce the risk of over-specification, variables had to distinguish at least 5% of the sample to be included.[28] With an $R^2$ of 0.37, the richer but more complex model 5 (12 variables) presents some interpretation difficulties with the inclusion of interaction categorical variables. *SIZE.TERM*, *SOLETRADER*, *BS.RE* and *3*PGT continue to be important[29] and $IND_2$ is now modified by age (less than one year) as one of the significant interaction variables. While *SOLETRADER* is premium-increasing, this is fully abated by the presence of a public accountant (*ACCT* × *SOLETRADER*). *REALPART* is also premium-increasing, but to a lesser extent than *SOLETRADER*. Balance sheets for partnerships and budgets for incorporated firms signal an increase in premiums. The remaining three interaction variables all pertain to $IND_3$. Premiums for $IND_3$ borrowers increase if there are either multiple owner-managers or if it is a soletrader and decreases for older firms (3+ years).

Potential weaknesses in the model specification and use of stepwise regression procedures discourage too detailed an examination of the particular variables included in the final model. It is reasonable, however, to conclude that the size and term of loans are significantly associated with interest rate premiums in the manner consistent with economy of scale. It seems likely that the association reflects some co-determination as a response to risk rather than direct causality through economies of scale alone. Provision of collateral is also important, but the modelling process leaves some ambiguity as to the value of different sources of collateral. This significantly premium-decreasing effect of on-balance sheet real estate accords with expectations but the absence of other sources of real estate collateral from the derived model appears inconsistent. It is possible that greater costs of securing such collateral largely abate any effect on premiums of reduced lender risk. It is also possible that the presence of guarantees (from both third parties and, for incorporated firms, owner-managers) suppresses the entry into the regressions of such collateral, given that many (42% of *3*PGT and 81% of *OMGT.INC*) are supported by real estate mortgages (see Table 2). The small cell counts (19 *3*PGT and 47 *OMGT.INC*) restrict further exploration of this issue. Similarly, the presence of *SOLETRADER* ($n = 17$) and *REALPART* ($n = 21$) may also suppress the entry of collateral[30], although the effect for these organisational form categories is to increase premiums. It is possible for this to induce entry of any associated off-setting (premium-reducing) collateral categories but, while collateral and organisational form interaction variables were considered, most were manually suppressed due to small cell counts (see Table 2).

The premium-increasing effect of third party guarantees in the models suggests that their provision is a response to lender demand for surety for loans which are already considered more risky; the provision of the security may be necessary to obtain the loan but not sufficient to reduce premiums relative to other loans.

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[28] This means that a dichotomous variable must have at least six cases in its smaller cell.

[29] The significance of the coefficient for *3*PGT has become marginal with the expanded variables set.

[30] Note from Table 2 that of the 17 *SOLETRADERS*, seven provided balance sheet security, five provided mortgages over owner-manager real estate and four had third-party guarantees. These numbers are not mutually exclusive.

The persistent premium-increasing effect of *SOLETRADER*, which by definition has the narrowest range of human capital stock, and the premium-decreasing effect for older firms are seemingly consistent with the human capital arguments of Pau and Shailer (1998) and, to a lesser extent, Cressy (1996a). While *REALPART* is also premium-increasing despite necessarily having greater owner-manager human stock than soletraders, the effect is less than half that of *SOLETRADER* (0.007 compared to 0.019). It is the difference between these that might best be attributed to Cressy's positive human capital effect, but the absence of the multiple owner-manager category (other than as part of the complex categorisation of $IND_3$) generally weakens the human capital interpretation.

The complex service industry ($IND_3$) effects warrant closer examination. For this industry, premiums (expectedly) decrease with firm maturity and increase with soletradership[31] and (unexpectedly) increase with multiple owner-managers. The latter was intended to proxy for human capital and so was expected to be premium-decreasing. The reverse effect for services is consistent with human capital dependency and asset specificity, whereby it is more risky to lend to multiple owner-managers when the value of the business depends on continued access to the stock of human capital. This view seems appropriate for the services industry which sells the skills or knowledge of the owner-managers. There are 20 cases of $IND_3$, of which 10 are 3+ years, eight are sole-traders and eight are multiple owner-managers. The sole-traders and multiple owner-managers (which are mutually exclusive categories) three and four respectively are 3+ years—leaving three cases of 3+ years receiving the full premium reduction, and five and four cases respectively of the full premium-increasing affects. This is consistent with human capital and maturity effects but the intersection effects might indicate over-fitting of the data.

*Limitations*: Given the variety of potential explanatory variables, the exploratory results obtained here are inconclusive in several respects. The cases include a wide range of organisational forms and industry types across which loan pricing behaviour might not be easily generalised into a single model due to multidimensional effects without much larger data sets. The sample size precludes testing of several potential categorical variables, and the limited variable set limits the testing of several promising aspects concerning collateral and human capital. The known limitations of using stepwise procedures for developing models (particularly order of entry consequences and sample size concerns) remain relevant here, but experimentation with variable ordering and backwards model development did not generate different models. Higher $R^2$s were generated by including categorical variables with low cell counts (that is, they distinguished less than 5% of the sample) but this appeared to be data-fitting and generated poorly behaving residuals.

Because the model development here is exploratory, the extent to which the potential categorical variable set may be incomplete is a notable limitation. This can only be addressed by a richer and larger data set in future research. The absence of a rigorous framework to guide variable selection also remains a limitation that warrants future attention.

## 6. Conclusion

This exploratory study of the differential pricing of loans in response to owner-managers' signals and categorical risk proxies provides evidence of several potentially important associations and effects, but the results indicate that further research of some key aspects is desirable. The most important result is that a simple categorical model explains a substantial part of the variation in interest rates premia for small business loans.

It also indicates the appropriateness of types of owner-manager signals and risk proxies, although further consideration and testing of potential signals and proxies is necessary. Human capital effects (proxied by the business age, multiple owner-manager and real-partnership categories) are weakly indicated but difficult to interpret given the interactions with industry. These ambiguous human capital effects signal the need for more detailed analysis of the potentially complex trade-offs of risk reduction (for lenders) by encouraging owner-manager effort through sunk cost effects, and income dependency and risk increases through asset dependency and specificity issues.

The lack of importance attached to some of the variables tested here, particularly financial statements, suggests that more needs to be known of the circumstances under which they are provided. For example, bank policy suggests they are expected to accompany loan applications. However, their infrequency suggests that provision is either voluntary or enforced by the bank only in particular circumstances. Their value (to the firms in this study) as voluntary signals is dubious given the lack of any significant premia-decreasing effect. If their provision is a consequence of selective bank demand, further investigation of the circumstances under which banks demand financial statements is desirable.

Given earlier research regarding the relevance of collateral in small firm debt, the apparent peculiarity of impacts on interest rate premia here is possibly a function of limitations in the data set.

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[31] Note that the soletrader effect is additional to the general *SOLETRADER* discussed above.

Further consideration of the costs of different sources and forms of collateral may help further understanding of this issue, along with the circumstances under and extent to which collateral influences rationing decisions or price.

The interaction of loan term and size (in a categorical schema), in their association with interest rate premia, may have implications for the way size effects on interest rates are interpreted in other contexts. Further research on this issue is necessary to identify the extent to which the association is a product of co-determination or causation.

Overall, while the results of this study attest to the value of simple categorical modelling of loan pricing, they also signal the need for further investigation into the types of categories and their effects.

## References

Akerlof, G. A. (1970). 'The market for "lemons": quality and the market mechanism'. *Quarterly Journal of Economics*, 84 (3): 488–550.

Ando, F. (1985). *Access to Capital by Subcategories of Small Businesses.* Report prepared for the US Small Business Administration, for Washington PA, JACA Corp, December [as cited in Evans and Jovanovic (1989)].

Ang, J. S., Lin, J. W. and Tyler, F. (1995). 'Evidence of the lack of separation between business and personal risks among small businesses'. *The Journal of Small Business Finance*, 23 (2/3): 97–120.

Barrett, G. R. (1990). 'What bankers want to know before granting a small business loan'. *Journal of Accountancy* (April): 47–54.

Bates, T. (1990). 'Entrepreneur human capital input and small business longevity'. *The Review of Economics and Statistics*, 72 (4) (November): 551–9.

Beaulieu, P. (1994). 'Commercial lenders' use of accounting information in interaction with source credibility'. *Contemporary Accounting Research* (Spring): 557–85.

Becker, G. S. (1975). *Human Capital.* New York: National Bureau of Economic Research.

Bester, H. (1985). 'Screening vs. rationing in credit markets with imperfect competition'. *American Economic Review*, 74: 850–855.

Bester, H. (1987). 'The role of collateral in credit markets with imperfect competition'. *European Economic Review*, 31: 887–99.

Calomiris, C. W. and Hubbard, R. G. (1990). 'Firm heterogeneity, internal finance and "credit rationing" '. *The Economic Journal*, 11 (399): 90–104.

Chan, Y. S. and Kanatas, G. (1985). 'Asymmetric valuations and the role of collateral in loan agreements'. *Journal of Money, Credit and Banking*, 17 (February): 84–95.

Chandler, G. N. and Jansen, E. (1992). 'The founder's self-assessed competence and venture performance'. *Journal of Business Venturing*, 7 (4): 223–236.

Cowling, M. and Sugden, R. (1995). 'Small firm lending contracts: do banks differentiate between firms?' *The Journal of Small Business Finance*, 4 (1): 87–98.

Cressy, R. (1992). 'The theory of the opportunistic entrepreneur'. *Small Business Economics*, 4 (4) (December): 267–271.

Cressy, R. (1996a). 'Are business start-ups debt rationed?' *The Economic Journal*, 106 (September): 1,253–70.

Cressy, R. (1996b). 'Commitment lending under asymmetric information: theory and tests on UK startup data'. *Small Business Economics*, 8 (5) (October): 397–408.

de Meza, D. and Webb, D. C. (1987). 'Too much investment: a problem of asymmetric information'. *The Quarterly Journal of Economics* (May) 281–92.

Dunne, T., Roberts, M. and Samuelson, L. (1987). 'The impact of plant failure on employment growth in the US manufacturing sector'. Working paper, Pennsylvania State University.

Edminster, R. O. (1972). 'An empirical test of financial ratio analysis for small business failure prediction'. *Journal of Financial and Quantitative Analysis*, 7 (2) (March): 1,477–1,497.

Evans, D. and Jovanovic, B. (1989). 'Estimates of a model of entrepreneurial choice under liquidity constraints'. *Journal of Political Economy*, 97 (4) (August): 808–827.

Evans, D. S. (1987a). 'The relationship between firm growth, size and age: estimates for 100 manufacturing industries'. *Journal of Industrial Economics*, 35 (4) (June): 567–581.

Evans, D. S. (1987b). 'Tests of alternative theories of firm growth'. *Journal of Political Economy*, 95 (4) (August): 657–674.

Fenton, R. N. (1985). 'Pre-insolvency: a lending banker's perspective'. *Professional Administrator*, 37 (1) (January–March): 8–11.

Ferri, M. G. and Jones, W. H. (1979). 'Determinants of financial structure: a new methodological approach'. *Journal of Finance*, 3 (3) (June): 631–644.

Gul, F. A. (1987). 'The effects of uncertainty reporting on lending officers' perceptions of risk and additional information required'. *Abacus*, 23 (2): 172–179.

Holmes, S. and Nicholls, D. (1989). 'Modelling the accounting information requirements of small business'. *Accounting and Business Research*, 19 (74) (Spring): 143–150.

Hutchinson, P. (1987). 'The financial profile of growth small firms: an analysis of the accounting ratios of Australian companies at and after flotation, 1964/65–1983/84'. PhD Dissertation. University of Bath, Bath.

Jackson, T. H. and Kronman, A. T. (1979). 'Secured financing and priorities among creditors'. *The Yale Law Journal*, 88 (May): 1,143–1,182.

Jaffee, D. M. and Modigliani, F. (1969). 'A theory and test of credit rationing'. *American Economic Review*, 59: 850–871.

Jovanovic, B. (1982). 'Selection and the evolution of industry'. *Econometrica*, 50 (3) (May): 649–670.

Keasey, K. and Watson, R. (1993). 'Banks and small businesses: is conflict inevitable?' *NatWest Quarterly Review*, Spring.

Leeth, J. D. and Scott, J. A. (1989). 'The incidence of secured debt: evidence from the small business community'. *Journal of Financial and Quantitative Analysis*, 24 (3) (September): 379–394.

Lippman, S. A. and Rumelt, R. P. (1982). 'Uncertain imitability: an analysis of interfirm differences in efficiency under competition'. *Bell Journal of Economics*, 13 (5) (Autumn): 418–438.

Manfuso, J. C. (1996). 'Small business: using benchmarking to evaluate the efficiency of small bank lending'. *Commercial Lending Review* (Fall): 86–94.

McNamara, R. P., Cocks, N. J. and Hamilton, D. F. (1988). 'Predicting private company failure'. *Accounting and Finance*, 28 (2) (November): 53–64.

Petersen, M. A. and Rajan, R. G. (1994). 'The benefits of lending relationships: evidence from small business data'. *The Journal of Finance*, 49 (1) (March): 3–38.

Pua, L. H. S. and Shailer, G. E. P. (1998). 'Asset specificity in small (owner-managed) firms'. *Accounting and Business Review*, 5 (2) July: 263–276.

Scott, D. F. (1972). 'Evidence on the importance of financial structure'. *Financial Management*, 1 (2) (Summer): 45–50.

Scott, D. F. and Martin, J. D. (1976). 'Industry influence on financial structure'. *Financial Management*, 4 (1) (Spring): 67–73.

Shailer, G. E. P. (1990). 'The multivariate performance of alternative accounting variables for predicting unlisted company failures'. *British Accounting Review*, 22 (2) (June): 151–161.

Shailer, G. E. P. (1993). 'The irrelevance of organisational boundaries of owner-managed firms'. *Small Business Economics*, 5 (September): 229–237.

Shailer, G. E. P. (1999). 'Classificatory loan pricing as an incentive for signalling by closely held firms'. *New England Journal of Entrepreneurship*, 2 (1) (Spring): 45–50.

Stanga, K. G. and Tiller, M. G. (1983). 'Needs of loan officers for accounting information from large versus small companies'. *Accounting and Business Research* (Winter): 63–70.

Stiglitz, J. E. and Weiss, A. (1981). 'Credit rationing in markets with imperfect information'. *The American Economic Review*, 71 (3) (June): 393–410.

Storey, D. J. (1989). 'Firm performance and size: explanations from the small firm sectors'. *Small Business Economics*, 1 (3): 175–180.

Storey, D. J., Keasey, K., Watson, R. and Wynarczyk, P. (1987). *The Performance of Small Firms*. London: Croom Helm.

Vos, E. A. (1992). 'Differences in risk measurement for small unlisted businesses'. *Journal of Small Business Finance*, 1 (3): 255–267.

Wright, M. and Robbie, K. (1996). 'Venture capitalists, unquoted equity investment appraisal and the role of accounting information'. *Accounting and Business Research*, 26 (2) (Spring): 153–168.

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# Cost accounting in small and medium sized Japanese companies: an exploratory study

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**Abstract**—Research on Japanese management accounting in the past decade has grown but knowledge of Japanese cost accounting, e.g. target costing, continuous cost reduction, has tended to be drawn from large, internationally successful firms rather than small and medium sized enterprises (SMEs). Moreover, Japanese practices are not static: changing socio-economic circumstances may be exerting significant pressures for cost management changes. The research was based on 13 company visits and semi-structured interviews in SMEs in Kyushu—mainly in manufacturing. Their costing systems proved to be similar to those of larger Japanese firms. Costing systems and cost management practices, though not uniform, emphasised simple routine accounting. They were not used extensively for decision-making or performance evaluation. However, sophisticated detailed processes of cost management, often centred on engineering and quality control, were the norm. The report closes with details of two contrasting companies. One was a traditional small subcontractor struggling to survive: the other was a scientific research-based organisation with unusual and innovative control systems. The paper speculates that there may be extremities representing the past and future in the wake of global competition and changes in the banking sector. Increased pressures within supply chains coupled to new pressures from capital markets are forcing SMEs to adopt the cost management systems of their larger counterparts and, at the margins, to experiment with new forms of control that are more profit oriented. Failure to do so may be a factor in the currently high mortality rate of SMEs.

## 1. Introduction

The last decade has seen a rapid growth of research in English on Japanese management accounting (see McMann and Nanni, 1995, for an up-to-date review plus Moyes et al. 1991 and Sakurai, 1996). Japanese cost management has attracted considerable interest outside Japan as academics and practitioners search for the elixir of Japan's post-1945 economic success. This has revealed how Japanese cost management systems in some industries are embedded in broader managerial practices—such as JIT and quality circles—pioneered in many Japanese companies but now widely emulated in the West (see, for example, Bromwich and Bhimani, 1994, and Yoshikawa et al. 1993). However, lacunae still exist: research on Japanese management accounting tends to be derived from interviews with managers—research methods tend to be static. Moreover, socio-economic pressures for transformation tend to be poorly explored, which is surprising given that Japanese accounting practices are embedded in distinctive social and economic contexts (see *Accounting, Auditing and Accountability Journal*, 1990). Also, research is highly skewed towards certain firms: it is unusual to find work on, say, public enterprises, retailing, or construction—where very different business practices can prevail.

Current research draws heavily from large firms in internationally successful sectors, especially vehicles and electronics. In Japan large 'core' companies co-ordinate development and production, and their permanent employees normally enjoy lifetime employment, generous employment protection laws, welfare provision, and rewards based on service. A high proportion of activities is subcontracted to small suppliers in peripheral markets whose employees tend to have less favourable conditions of employment (Kenney and Florida, 1988). It may be unwise to assume that Japanese management accounting can be treated as a homogeneous and distinctive whole.

There is little research on management accounting in small and medium sized enterprises (SMEs) in any sector available in English, which is surprising given that most of Japan's six million businesses are small, play a central role within supply chains, and have a record of innovation and efficiency which was crucial to Japan's successful post-war development. Many SMEs, especially in the vehicles industry, are closely linked to larger firms—sometimes even sharing information systems and swapping managers (Asanuma, 1989). However, SMEs are not homogeneous: some are family owned: some seek to retain their independence within market relations rather than working within a *keiretsu*; some prefer to be entrepreneurial and innovative whereas others, especially in services and retailing, supply traditional markets and products. Whatever, SMEs in the manufacturing sector are confronted with harsh competitive pressures reflected in their high bankruptcy rates and less benign labour practices (Itoh, 1992; *The Economist*, 1990; Lipietz, 1992). They are subject to intense pressure to reduce costs while retaining high quality levels. The lingering suspicion is that outside Japan's successful large industrial firms, especially within smaller manufacturing firms, management accounting practices may be more different than is often presumed.

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Management control practices evolved in Japan under different socio-economic circumstances from those in the West. Following post-war struggles between capital and labour, coalitions of politicians, business leaders and bureaucrats exercised indicative planning, based on boosting exports in selected key industries, prioritising corporate rather than social investment, and the pursuit of mercantilist protectionist economic policies (Johnson, 1982). Currently, Japanese domestic producers are suffering reduced international cost competitiveness due, inter alia, to the previously high value of the yen; financing problems and bad debts ensuing from the banking crisis at the end of the Hesei Boom in 1989; and reduced barriers to import penetration, coupled to changing work attitudes, especially among women and the young. These are having effects upon corporate systems and priorities within Japan (JETRO, 1993) as political consensuses have withered, leaving national leadership weaker and more fractured (Itoh, 1992).[1]

MITI predicts that Japan's manufacturing sector will shed between 1.24 to 1.45 m. workers in the five years from 1996 (quoted in Aera, 1997). The Science and Technology Agency, Japan, claims that by the early 21st century Japan will be overtaken by South Korea in semiconductors and steel production, by Taiwan in electronics and personal computers, by China in home appliances and by Singapore in research and development. Japanese relative cost advantages have been seriously eroded; for example, one industry analyst quotes labour costs in Malaysia as being one fifteenth of those in Japan. Not surprisingly Japanese companies are relocating production overseas. In 1995, 82% of Japanese colour TVs, 56% of Japanese VCRs, 86% of Japanese stereos and 48% of Japanese CD players were manufactured abroad (Aera, 1997). Since 1992, US GDP has increased by 22% whereas Japan's has increased by 6% (*The Economist*, 1997). This has led to clarion calls in Japan for major reform of the Japanese economy including: the reduction of government debt; deregulation of markets including insurance, transport, telecommunications, retailing, distribution and housing; and reform of corporate culture, especially the overhaul of lifetime employment systems and promotions by age seniority. It is possible that current competitive pressures may induce a growing emphasis upon short-run financial management within companies and threaten the social accords that underpin Japanese management approaches, including accounting ones. If so, this is likely to be manifested in Japanese SMEs, which are often at the sharp end of such pressures.

The above sentiments formed the backdrop for the research reported here. Its aim was simple: through a series of short visits to Japanese SMEs it sought to describe how they conducted cost accounting and to what effect. Several firms were studied rather than conducting a single in-depth case study. This would yield more representative data, albeit at the cost of depth. Given the study's exploratory nature, investigation was pursued through site observations and semi-structured interviews rather than postal questionnaires.

The research aim was to determine whether costing and cost management systems in Japanese SMEs differed from systems in their larger Japanese counterparts as described in previous research (for example, Chow et al., 1991; Hiromoto, 1988; Monden and Sakurai, 1989; Scarbrough et al., 1991; Yoshikawa et al., 1989). In addition, it was hoped to shed light on whether Japanese SMEs were experiencing new management problems, hinted at by Japanese colleagues, such as growing employee resistance to constant cost reduction, managerial burnout and a lack of competitiveness—especially internationally (e.g. Yoshikawa, 1997). If so, it was hoped to ascertain how they were responding. The effect of increased competition upon employment practices—especially commitments to lifetime employment, performance evaluation and rewards, was of particular interest. These underpin the cost management practices of large Japanese firms but it was not known whether this was so in SMEs. The researchers suspected that their increasingly harsh economic climate might have encouraged adaptations of Western management accounting methods previously regarded as overly short-run, objective, hierarchical and alien to Japanese management philosophies.

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[1] This research was conducted in 1994. Since then the Japanese economic crisis has deteriorated considerably.

## 2. Research methods and sites

The research was conducted in eleven SMEs.[2] Details of the companies are contained in the Appendix. Access, especially to small companies, proved more difficult than anticipated. After failures through alternative routes, as is often the case in Japan, access was secured mainly through informal contacts and introductions. The companies differ in size and are heavily weighted to medium-sized companies. The firms do not constitute a representative sample, even within the Kyushu region. Nevertheless, the range of companies studied was sufficient to generate several interesting insights. They embraced a variety of sizes, products, markets, forms of ownership and inter-company relationships. All lay on Kyushu Island in southern Japan, in a radius of approximately 100 miles from Fukuoka.

The aim was to study independent companies employing fewer than 1,000 employees, preferably in manufacturing. Independence was defined as privately owned, not a subsidiary, and without significant ownership by a supplier or customer. All but two companies satisfied the size criteria and all but one were engaged directly in manufacturing. However, definitions of independence and organisational boundaries proved more complex than anticipated as some companies had some cross-institutional share ownership and inter-company relationships, in several instances within a *kieretsu*. Two of the larger companies had the appearance of what would be conceived as a subsidiary in the West—though their managers vehemently argued otherwise.[3] However, only two companies did not have a significant element of family ownership (ranging from 10 to 100% of equity) which tended to indicate an active family involvement in senior management.

Visits to the research sites were conducted during February and March 1994. A questionnaire in English and Japanese was prepared consisting of 37 questions which formed the basis of interviews.[4] The first section, on basic company information, asked questions on each firm's age, history, size, ownership, financing, customers, competitors, supplier relations, unionisation, and employee conditions of work—including lifetime employment commitments. The second section, on the general management of the company, asked questions on organisation structures, performance evaluation, strategy, production technology, controls, and financial and physical indicators. The final section concentrated on accounting matters, including: the measurement of revision of cost targets; the relationship of routine product costing information and budgets to cost management; product costing systems and their usage in target setting, rewards, pricing, strategy and marketing, and external reporting; distribution of cost information; who is responsible for producing it; whether techniques such as target costing, ABC, value engineering, cost tables, product life cycle costing and customer costing were used; and how cost management and information fitted into the general management of the company.

The questionnaire was mailed out in advance to inform subjects of the nature of the interview and to solicit routine descriptive information beforehand. Each company supplied relevant company reports and information packages. An interview was requested with the general manager and the persons responsible for cost accounting. In each company there was one interview; in four companies this was with a single individual, usually the general manager; in the remainder it was with groups of managers ranging from two to six, embracing the spectrum of tasks and responsibilities previously specified. In six of the companies the researchers were able to observe operations during factory tours. The company visits/interviews spanned from one hour to half a day—the latter being more typical. All interviews were conducted in Japanese with occasional summary translations into English for the non-Japanese speaking researcher. A summary transcript of the interviews was made during the interview in Japanese.

## 3. Research results

### 3.1. Costing systems

There was no consistent pattern in the type of cost systems employed, even bearing in mind the variety of firms' different products and technology. Of the nine companies that provided usable responses[5], five used standard costing, eight used full absorption costing, and seven used marginal costing (i.e. six used both full and marginal costing: the latter was commonly used for specific decision purposes rather than routine reporting). Previous research reports relatively traditional and multiple product costing systems in large Japanese firms, e.g. Scarbrough et al., 1991; Currie and Seddon, 1992; Sakurai, 1990; Yoshikawa et al., 1989. This also proved to be the case in the SMEs studied here. However, it would be wrong to assume they were frozen in time: there were signs of innovation. One medium-sized firm even had an activity-based costing (ABC) product costing system for routine reporting and another claimed to use ABC for tracing overhead costs. One general manager had instituted a 'real time' costing system for production with potentially instantaneous feedback of actuals. At first sight, given their predilection to full costing and traditional accounting methods, it could be argued that the routine formal cost systems of the SMEs were not attuned to best economic practice. However, such a conclusion would put too heavy a weight on the managerial importance of cost control systems vis-à-vis cost management systems that are discussed later. Informants intimated that accounting information was often used in a sophisticated manner: marginal costing was used extensively though selectively, especially with respect to decisions regarding out-sourcing of supplies; full costing was an input to pricing decisions but rarely its determinant.

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[2] Two other companies, Hirata (assembly line manufacturer) and XYZ (vehicle components manufacturer) were visited but are excluded from the companies listed in the Appendix as they did not provide detailed responses to the questionnaire. The research questionnaire was not very relevant to Nippon Water due to its distinctive mode of management and its being a service company. Consequently, the interviews there deliberately followed a different procedure concentrating on issues underlying the questionnaire design rather than its specific components. Nevertheless, the research access at Nippon Water was good and informative—hence its inclusion within the main list of companies studied.

[3] Noritaka Diamond was a wholly-owned subsidiary within the Noritaka Group, one of Japan's leading ceramics manufacturers. Kyushu Hitachi Maxcel was a wholly-owned subsidiary of Hitachi. Both subsidiaries, however, had considerable independence. In Noritaka Diamond this was due to the distinctiveness of its business and operations from the rest of the Noritaka Group, whereas in Kyushu Hitachi Maxcel this stemmed from Hitachi's long-standing practice of granting considerable autonomy to its business units. In both instances managers perceived themselves to be in a relatively small business despite not being so legally. Given such perceptions and the autonomy of the units, they were retained within the group of firms reported upon.

[4] Copies are available from the authors upon request.

Routine product costs and departmental budgets were produced in all firms, with the longest reporting cycle being monthly. Standards and cost targets were revised frequently. Of the nine companies who supplied usable responses, four revised standards every six months, two more frequently, and the remaining three upon design changes. In all but one of the nine companies the routine cost accounts were integrated with the financial accounting systems: indeed, the contribution of formal cost systems to financial reporting was seen as one of its major functions in virtually all of the companies studied. However, it would be wrong to assume that formal cost information was irrelevant to management. All 10 manufacturing companies studied saw it as useful information for pricing and (bar one) for strategic and marketing plans. The tenor of remarks though emphasised taking care to avoid undue reliance upon costing data within such deliberations.

One common practice not normally found in Western firms concerned the treatment of direct labour. Discussions in several companies revealed that it tended to be treated as a fixed cost but outwork (putting out) labour costs were treated as variable. Sometimes, but less frequently, short-term contract and part-time labour was also differentiated as a variable cost. Thus, to a degree, labour market distinctions between core (permanent) workers and peripheral (disposable) workers were reflected in the accounting treatment of their costs.

The role of financial information in managerial performance evaluation proved difficult to ascertain. Financial accounts incorporating product costing information were normally the basis of company-wide bonuses but in no firm other than Nippon Water did cost systems form the **primary** basis of managerial performance appraisal and rewards. Generally, there was an aversion to individualised financial performance-by-results appraisal and reward systems. However, it would be unwise to infer that financial performance was immaterial for evaluating and rewarding managers. Five companies stated that the budget results were one of several important criteria within evaluation systems for middle and senior management and could indirectly affect pay and promotions. Nevertheless, it was difficult to ascertain how performance evaluation was done explicitly. The 'fuzziness' of this process may be due to the complexity of managerial processes associated with it; or Japanese cultural concerns to avoid an individual's 'loss of face'; or an emphasis on collective responsibility and subjectivity, rather than Western individualistic seemingly objective appraisal systems, or simply the limitations of the research methods based on short visits by strangers. Nevertheless, under gentle probing, it was clear that sanctions could be applied to managers deemed to be under-achieving, normally by transfer to a less influential position with lower status.

Accounting in Japan is not professionalised and management structures tend to be less specialised than in Western companies. Differences in the division of managerial labour, professional orientation and nomenclatures for positions and departments between Japanese and Western companies, make it difficult to dichotomise whether responsibilities for maintaining cost recording systems in the Japanese companies resided in accounting or non-accounting departments. Nevertheless, and notwithstanding this caveat, an attempt to do so was made. In four firms the responsibility lay with an apparently dedicated accounting office (management control) functionally outside of (but not uninvolved with) line management. Here the duties normally extended to financial accounting and, in several instances, negotiation of contracts and prices from subcontractors as well as servicing managerial teams. Accounting was normally seen as a distinct career in itself: it did not include extensive prior training in other managerial functions, nor was it expected to lead to general management—though this was not automatically precluded. In the remaining six firms, cost recording responsibilities resided within other management functions, normally engineering, production or general management. Sometimes these would be designed as cost-engineering sections staffed not by specialist trained accountants but rather by design or production engineers, pursuing career paths within general management and production.

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[5] Often questions were deemed not relevant or answers were not forthcoming for various reasons. These were classified in a not applicable/no reply category and excluded from the total number of responses. Consequently the total number of responses to each question varies in our account.

In general, the research tended to confirm that costing and cost management systems in the Japanese SMEs studied resembled those of larger successful Japanese companies. Cost systems tended to be relatively traditional, conventional and not dissimilar to Western practice. As with their larger counterparts, the differences lay in the processes of cost management. The detail and sophistication of systems was unexpected given the researchers' prior expectations for Japanese SMEs. The result may be biased by the sample, which was heavily weighted towards medium-sized firms in intermediate positions in supply chains, operating in internationally competitive markets, with a smattering of other companies operating in primarily domestic, relatively protected markets. While all but one maintained independent market relationships with suppliers, five had some information 'sharing' relationships with dominant customers. There were, however, no very small firms operating at the early stages of manufacturing processes organised within a *keiretsu* dominated by a large Japanese firm. This point will be returned to later.

### *3.2. Cost management*

It would be an error to assume that the SMEs studied were neither knowledgeable nor highly concerned about costs. However, routine conventional cost accounting systems were not normally central to this cost awareness: rather they were used more for financial accounting purposes, periodic checks on aggregate managerial progress and performance, and providing one of many sources of data into cost management processes. Like their larger Japanese counterparts, the distinctiveness of costing in the SMEs studied lay in the complex processes of cost management rather than within their formal product costing and budgetary control systems (Scarbrough et al., 1991). As one manager interviewed put it, 'Thinking about cost systems is more important than costing itself.' Or, as another manager stated, 'Costs are certainly important...but more important are people researching their actions'. The emphasis within the Japanese firms studied was upon drawing from the experiences and creativity of employees.

The 10 manufacturing companies had a range of automation ranging from highly automated to manual production. Several respondents in highly automated companies went out of their way to point out that it was not an end in itself—they were prepared to use older manual methods if they served the purpose. One company had process production—the remainders were batch producers with a tendency towards small batches. All of the manufacturing companies had adopted Just-in-Time (JIT) principles and showed a strong commitment to quality and continuous improvement. Given their apparent commitment to the management technologies of large Japanese companies, it is not surprising that they all employed cost management techniques associated with a JIT philosophy. All but two of the 10 manufacturing companies used target costing; all but one used value engineering; half used cost tables; but only one used product life cycle costing. Kanban systems and physical indicators, e.g. defects, lead-times, inventory reduction, were deemed to be more effective means of monitoring operations on a day-to-day basis than routine cost systems.

However, it would be wrong to assume that financial ratios were not significant indicators of production performance. While there was variation in how they were operationalised, all but one of the 10 manufacturing organisations used a combination of throughput and cost/profit measures, normally expressed in terms of each worker and/or group of machines, as key indicators for monitoring production. The throughput measures varied: quantities per machine, lead-times, downtime, and capacity utilisation were the most common. The exception used profit and costs exclusively. Many of the companies reviewed the physical performance measures daily. Cost results tended to be reviewed less frequently, normally monthly, but never longer than this. Only one company used historical costs for setting cost targets: the remainder based them on the outputs of continuous cost reduction processes, As would be expected given continuous cost reduction, cost targets were revised frequently.

In the majority of firms, cost management committees cascading down to shop floor levels were central to organisational structures of control—both formally and informally. These would invariably be the province of general managers and engineers. Often they provided a focal point of management activities and they were closely integrated with production, design and quality activities, i.e. the cost management was performed within a holistic approach to management rather than constituting a distinct item: cost management committees were an integral part of the processes of quality and continuous improvement. Teams were normally horizontally integrated across functions and vertically integrated from senior management down to individual shop floor cells. As McMann and Nanni (1995) note, a feature of Japanese management accounting is its integration with other facets of management, especially quality control, JIT, value engineering, and target costing.[6] Our research suggests that the Japanese SMEs were not exceptions to this rule.

Employee suggestions and cross-functional collaboration over hierarchical levels (including the lowliest levels) were deemed to be normal and essential. In several companies this was deliberately reinforced through the management of space. The architecture and layout of offices and production lines were deliberately designed to promote integration. For example, engineers would be physically located alongside production lines in open plan arrangements, thus making them visible to production workers and vice versa, and often sufficiently close to engage in conversation with little physical movement. Details of cost reduction projects being jointly investigated by cost engineers and workers, often arising from worker suggestions, were on public view and each cost engineer was expected to be working on a minimum number of such projects.

No company routinely passed periodic accounting reports down to production cells, but they were invariably distributed among senior and departmental managers. However, relevant information for cost reduction targets and quality improvements appeared to be easily accessible to teams and cost feedback was normally an aspect of project monitoring. It would be over-simplistic to assume that norms of openness unproblematically extended beyond company boundaries. No firm outside of a *keiretsu* expressed any enthusiasm for sharing costs with customers or suppliers. Their reaction was—'Only if we have no alternative!' If information sharing between small suppliers and large customers is common in Japan then it may be due to economic pressures rather than cultural norms.

The above suggests that routine accounting systems and accountants have minor roles in managing these SMEs, but it would be a mistake to conclude that costing plays a marginal role in their management. Indeed much of the management studied was permeated by and organised around cost management. The essential point is that it does not reside in accounting departments and formal cost reporting systems but elsewhere in other management processes and functions associated with cost management.

### *3.3. Cost strategies: continuity, cracks, and experimentation*

Many of the companies, especially those subject to international competition directly or indirectly, were facing major problems on pricing and cost competitiveness. All but two of the manufacturing companies reported reduced profitability over the previous five years. One of the exceptions had suffered reduced sales but had maintained profitability through drastic cost reduction. This more recent cost pressure brought about by the end of the Heisei Boom, the then high value of the yen, tightening credit, and increased foreign competition, may account for why this study found costing to be so central.

All the manufacturing companies professed a commitment to maintaining lifetime employment for permanent workers. The extent of lifetime employment amongst the SMEs studied was a surprise, as the researchers had assumed that it tended to be the preserve of core employees in large firms.[7] No labour-slashing plans were apparent, though several companies had retrenched severely with respect to part-time and contract workers, and had reduced annual bonuses.[8] The attachment to lifetime employment could not be attributed to unionisation within the Japanese companies: one half had no unions and the remainder reported that unions in their companies had negligible power.

Most companies saw their strategy in terms of technological and product innovation: high quality products and customer servicing, and sufficient product differentiation to sustain premium pricing. This fed through to their priorities for suppliers, especially vis-à-vis quality. Six companies reported concerns over their relative costs, including supplier costs, and hence their ability to remain internationally competitive. Not surprisingly this was more acute among the companies exposed to international competition: comments on the innate superiority of Japanese methods tended to stem from companies serving essentially domestic markets.

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[6] The researchers were surprised at the extent Japanese SMEs used 'advanced' techniques pioneered by large Japanese companies. Several managers commented that education and training programs of Chambers of Commerce, sometimes prompted by MITI, had been influential.

[7] Lifetime employment is not as widespread in Japan as is commonly assumed—only about 30% of the labour force may be so covered (*Economist*, 1990), though estimates vary considerably.

[8] It is difficult to draw comparisons between Japan and the West without a comparative study. However, some months previously one of the researchers had studied a small UK vehicle parts company similar in size and product range to MidVeh. The differences were marked. MidVeh had more detailed and sophisticated cost systems and, unlike MidVeh, the UK company did not use JIT production or associated quality systems. Its impending preoccupation appeared to be with breaking strong unions as a prelude to taking labour out and casualising its labour force. Clearly, a sample of one cannot be used to generalise about UK companies. However, the contrasts are stark, especially bearing in mind that MidVeh was not exceptional with respect to the other Japanese companies studied.

Most companies had, or were contemplating, shifting low value-added production functions to low cost areas, mainly in the Pacific Rim, such as Malaysia, the Philippines, Thailand and, increasingly, China—which was perceived as a major competitive threat and opportunity simultaneously. Several companies questioned the viability of sustaining such a strategy in the longer term if it were to lead to 'hollowed out' corporations with high value added service activities such as research and development, and marketing and distribution in Japan, and low value added production moved overseas. Schmidt (1996) argues that such a fragmentation of production negatively affects Japanese costing systems, as they depend upon close co-operation of design and production functions for cost control.

While it would be wrong to claim that cost pressures were provoking major structural labour market changes within the Japanese firms studied (including abandonment of lifetime employment commitments), or a desire to radically depart from well-proven Japanese management methods, cracks within existing systems and pressures to change were apparent. In the main these emanated from problems of maintaining competitiveness in the face of increasingly global competition and ensuing changes in the international division of labour. These were being made more acute by domestic economic problems and, ironically, affluence stemming from Japan's past economic success.

### *3.4. Extremities of change*

The above reports the bulk of the findings prior to the last day's research visits. The message was essentially one of growing management change within a continuity of commonly understood Japanese management philosophies. However, costing and cost-related issues were increasingly coming to the fore. The changes tended not to be dramatic nor were the SMEs' cost systems markedly distinctive from those of their larger counterparts. On the last day of field visits, two cases arose: Nippon Water Science and XYZ, which deviated from the above conclusions. Paradoxically both had been left to the end, as one company was not in manufacturing directly and the other had given rise to problems of access.

Nippon Water Science had been recommended for study as a distinctive and managerially innovative company. It is primarily a scientific consulting and research laboratory that lives off royalties from inventions sold to companies. Significantly, it was receiving local and national state support from the local prefecture and MITI respectively as an important experiment in future management control models and a high value added service company that was scientifically and managerially creative. Its organisation was strongly permeated by its president's belief that a second industrial revolution is underway based on adaptive organisations and a consumer society. It was run according to three enunciated principles on project cells, performance evaluation, and salary systems.

Individual companies were limited to 50 employees organised into work cells, each headed by a project manager with the power to select team members, organise their activities and to control their budget. The cell life was the project life, though employees could be in more than one cell simultaneously. It employed mainly young highly qualified science graduates on temporary annual contracts—there was no commitment to lifetime employment. Each person had considerable discretion to negotiate and select the work activities they undertook.

Performance evaluation was made according to a formal system based on the stages of engineering development each employee undertook on each project. The stages ranged from the creation of science through to the application and usefulness of the ensuing engineering technology—with the latter stages being much more heavily weighted for performance appraisal purposes. Payment depended on ability and performance—not qualifications or age or service. Each worker had a modest basic salary with the remainder determined by the weighted value of each engineering level on each project undertaken, times the percentage of their time allocated to that project. Bonuses depended on the actual profit accruing from individual projects completed. Engineers with insufficient projects had to create a new project or find a new project team or eventually lose their job. An overloaded employee could transfer work outside, but at the cost of a smaller salary due to a reduced work denominator. The distinctiveness of the systems lay in the absence of any allegiance to lifetime employment, their emphasis on individual rather than collective performance evaluation, formal objective systems of appraisal, payment by results rather than seniority, and the emphasis upon creativity and proactivity rather than conformity. In many respects the systems were quite alien to normal Japanese management control conventions. Whether they are a pointer to the future in Japan remains to be seen.

The last organisation studied, XYZ, stood in sharp contrast to the above.[9] It was not in a new innovative scientific sector but rather in the *chusho kigyo* sector of small firm subcontractors that traditionally have supplied 70% of bought-in parts to the large Japanese car firms. They are often at the cutting edge of competition with a precarious financial position: their bankruptcy rates are higher and their credit shorter the smaller the company. Initially the owner of this small vehicle component manufacturer, XYZ, had refused to see us when he learned that we did not have a 'JapVeh' car.[10] Later he relented and a visit was arranged. The following account draws heavily from the field notes of the Western researcher as they convey events more accurately and vividly than subsequent 'sanitised' summaries. The notes were produced outside of the research methods. They are produced here as self-criticism and to illustrate the potential of more intensive participant observation methods, which have been neglected in research on Japanese management accounting. Such studies in other areas of Japanese organisations reveal a more complex and conflictful portrait than studies based on short visits and interviews, e.g. Kondo, 1990. The fragment below is intended to illustrate how a chance 'critical incident' can provide additional insights.

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[9] Unlike the other companies, XYZ did not complete the questionnaire and thus details are not contained in the Appendix.

> 'This factory looks different from the rest. It's located on a small scruffy industrial estate of mainly metal-bashers. This company is very small...We go into the entrance that takes us straight into a general office. It's not like the other places we've been to—rather scruffy and dismal—the two young girl receptionists are chewing gum and they don't bow to meet us. We go straight to the President's office next door. It's a bit like those you find in scrapyards at home (an exaggeration). The seats for visitors are like old torn car seats and the ashtrays are overflowing. The President is different—he's not in a suit but a light anorak and slacks. He looks tough and has scarred hands. He's a character—never stops talking—mainly about [JapVeh] and the recession. He's on the sharp edge and edgy about it. He says there's nothing worth seeing at his factory—it's very rudimentary and a big percentage of the workers are part-timers—but he will take us to [MidCo][11] and then the nearby factory of [JapVeh].'

We were then driven to the nearby MidCo and JapVeh factories where we were given factory tours, saw company videos and held the research interviews as described previously. The President of XYZ then took us back to his factory in his large new JapVeh car. An animated discussion ensued during the journey. Its tone is again best conveyed through field notes.

> 'Koga compliments him on his nice new car. He says he bought it last year from [JapVeh] to try and help them. Their managers pressured him into buying it—every time he saw the manager at [JapVeh] the manager suggested that he [the President of XYZ] should buy a new JapVeh car. And he should bring him names and addresses of other people he knew who wanted to buy a new car. (Now I know why he was so concerned about what car we had and whether we wanted to buy a new JapVeh one!) He's very bitter about the pressure [JapVeh] put on subcontractors. He says you can always tell a [JapVeh] subcontractor—they have a big new [JapVeh] car and no money! This is how [JapVeh] grows.
>
> 'He says he is at his wit's end. He doesn't want his son to enter his business. He complains he works 365 days a year. He has to constantly cut costs but it is proving impossible to do so. Previously he did it by employing students and women part-timers. But even this did not work enough—more cost cuts were demanded. He's tied to [JapVeh]. He can't see how he can get another big customer. He will cut prices even though it will lead to bankruptcy.
>
> 'He has another customer but he is only small. He [President of XYZ] is trying to develop a new product for [JapVeh] but to no avail—they are not interested. He has asked [JapVeh] for increased production but he didn't get any more. He has had to lay off workers. He complains bitterly that we are friends of [JapVeh] but come the recession we are the first to suffer—we are not making any profits. He says, "This is the reality of Japanese business behaviour and style. The true picture is not like the videos we've just sat through. I cry every night about my business". He goes on to talk about how friends' small businesses have recently gone bankrupt.'

The following Monday the Western researcher recounted this research visit to a Japanese colleague at Kyushu University. He smiles wistfully, and says, 'That's the Japanese *keiretsu*.'

## 4. Conclusions

The Japanese economic and business world is changing as a consequence of financial crises. The Banks' struggle with bad loans has left them without the means to fully prepare for deregulation.

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[10] 'JapVeh' and 'XYZ' are pseudonyms for a major Japanese vehicle manufacturer and its small vehicle component manufacturer respectively used to preserve anonymity.

[11] 'MidCo' is a pseudonym for XYZ's major customer which is a medium-sized 'independent' component manufacturer which mainly supplies a nearby vehicle assembly factory of JapVeh.

As a result, the market supply for loans is shrinking. The seriousness of the situation is evident in the actions of many manufacturing companies, including Nissan Motors, Mitsubishi Motors, and many major financial institutions in the banking, insurance, and security sectors that have entered into capital relationships with overseas companies. This would have been abhorrent until a few years ago.

Companies that previously relied upon banks for funding are now forced into self-financing or must go directly to financial markets, e.g. by issuing bonds. Prolonged economic depression, increased international competition, and deregulation in financial markets are producing new financial pressures on top management in SMEs, as well as their counterparts in global large firms. Previously, the major banks at the centre of the company groups that dominated enterprise groups in Japan after the war[12] met the capital needs of other companies in the group at low interest. During the Heisei Boom period, with its high rates of capital appreciation, there was little pressure for high operating returns on capital. Japanese firms, large and small alike, had little experience of raising funds in competitive financial markets. The profitable international firms with competitive advantages in global markets were exceptions.

With deregulation, the onset of depression after the end of the Heisei Boom, and the resulting bad debt problems in the Japanese banking system, this situation is now changing. There is much greater emphasis upon the need for short-term profitability and the requirements of capital markets. However, the ramifications of this upon financial management systems within enterprises are currently unclear. The Japanese economy and many companies are beset with financial confusion and experimentation. It may be too early to conjecture whether demands for financial engineering—with an emphasis upon short-run financial performance profitability measures and the ability to quickly cut labour costs—will replace cost management systems within flexible production that are based on skilled, committed employees with lifetime employment. However, as deregulation advances in financial markets and Japanese economic growth slows, lifetime employment may face severe challenges.

The research results intimated that many of the firms were entering a new but modest phase of organisational control experimentation to address global economic pressures and to increase short-run profitability. The research was conducted in the early stages of the recent Japanese economic downturn so it is perhaps unsurprising that the changes it traced were modest. Nevertheless, the findings resonate with other recent studies indicating a desire of Japanese companies to make segmental costs more visible and individuals more accountable. For example, Hopper and Joseph (1995) and Yoshikawa (1996, 1997) all detail experiments by Toyota involving new production systems and more devolved administrative structures; Yamada (1991) traces a growing adoption of individualised payment systems. Schmidt (1996) claims that lay-offs and early retirements are deleteriously affecting employee morale and merit pay based on Western individual performance measures, rather than seniority, are becoming a significant proportion of remuneration. This is resulting in managers laying more emphasis upon short-term success and financial measures such as ROI (return on investment) and earnings. All indicate a strong interest in individual performance evaluation and rewards, delegated financial management within central reporting structures, and detailed cost measurement of sections. Two management control systems in particular have recently been of interest to Japanese firms: the In-house Company System for larger companies, and Micro-profit Centres for SMEs (see for example, *Diamond Harvard Business*, 1996: 6–53; *Kigyou-Kaikei*, 1995: 44–65).

The in-house company system was first introduced by Sony in 1994. Mitsubishi Chemical, Hitachi, Daiei, Takeda Pharmaceutical, Toto, Ascii, and others soon followed suit (see for example, Nishizawa, 1998: 53–54). Previously most of these companies had a divisional structure, typically resulting in 20 to 40 and sometimes more than 50 divisions. Manufacturing and marketing were usually separate independent divisions, in contrast to the Western practice of division with delegated responsibility for development, manufacturing, and marketing combined. The Japanese belief was that independent manufacturing and marketing divisions would improve the efficiency and flexibility of each function, and promote swifter adaptation to changes in market demand. However, Japanese divisions could be cut off from the manufacturing and marketing functions despite being responsible for the performance of its products. These arrangements promoted market share and sales growth rather than profitability (Odagiri, 1992).

The in-house company system, adopted by Sony, arranged its 27 divisions into eight in-house companies. Each retained the manufacturing and marketing functions within their control so that their president could be the head of an investment centre whose performance was evaluated by ROI (see Sony Corporation, 'Revolution on Management Structure', Sony Corporation, 1994). The purpose of the in-house company system was not merely to increase profitability incentives but also to increase the flexibility and speed of response to market changes by the development, manufacturing, and marketing functions. Many Japanese companies strongly believed that improving the flexibility and speed of the latter is the key to survival and recovering profitability in their difficult economic situation. In previous divisional systems the company's executive board included heads of all divisions and a chairman, president, and vice-presidents. There could be several dozen directors. This resulted in the board discussing each division's operations. In contrast, the board in the in-house company system includes only a chairman, president, and vice-presidents. It is usually around 10 members in total and its discussions are intended to focus on strategies and where to concentrate resources. The day-to-day operations of each in-house company are the responsibility of its managers. This in-house system produces a structure of board and divisional responsibilities closer to Western practices in an attempt to emphasise profitability and rapid response to opportunities.

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[12] Following the dissolution of the *Zaibatsu* (large trading groups) by the GHQ of the US occupation army during the post-war restructuring, many major banks became central players within newly developed and rapidly growing manufacturing groups. *Keiretsu* (which are based on supply-chain networks) tended to develop in the 1960s.

Micro-profit centres have been promoted for SMEs grappling with the new economic pressures. It was originally devised, developed, and promoted by Kyocera (Cooper, 1995: 304–316). It can vary considerably according to factors such as the industry, company scale, and production technology. Following Kyocera's practice, each micro-profit centre (amoeba) of around 15 workers is assigned responsibility for the profitability and execution of each job undertaken. The transfer price to the marketing department is the sales price for the amoeba, and the transfer price from upper-stream amoebas constitutes its purchase price. Profit per labour hour is used as a profitability index. The intention is to make workers profit-conscious and to have strong incentives to cut costs—for example, being willing to cut labour by transferring idle workers to another amoeba; or to improve production processes to save labour, material, and costs; or to talk to the marketing department or even customers directly to help fulfil their demands. In the recent economic and business situation in Japan, many SMEs have been adopting micro-profit centres to provide incentives for profitability and cutting costs, and it is relatively easy for SMEs to form a set of amoebas and divide and distribute jobs accordingly. If the markets of an SME are small, requiring few demand changes and minor technical developments, then the Amoeba system may be effective in directing attention upon profitability and survival. It is too early to judge the scale and effectiveness of these recently popular palliatives for troubled Japanese companies. Moreover, the research found no examples of the above two systems being applied in the companies studied. However, as explained, their changing cost management practices and concerns were consistent with movements in similar directions.

Neither XYZ nor Nippon Water typify the SMEs studied—rather, they represent extremities on a continuum of possibilities for change. Policy makers in Japan perceive Nippon Water as representing one strand within possible future directions. It is high value-added, creative, and based on scientific knowledge creation from qualified scientists rather than exploiting efficient manufacturing. Its individualistic controls coupled to temporary employment contracts denote a severe rupture from employment practices cherished elsewhere in Japan, especially within large manufacturers. Being an independent service firm, it could more easily adopt such control strategies. It is questionable whether this can be the case for many of the other companies studied confronted by problems of cost competitiveness and potential 'hollowing out' following the transfer of operations abroad. As will be discussed below, abandoning lifetime employment and related labour practices may imperil the very strengths of Japanese manufacturing.

As the colleague commented, an understanding of costing change in manufacturing SMEs needs to recognise the role of *keiretsus*. These consist of a core large manufacturer supported by member companies in the supply chain. The latter are organised by the core manufacturer who has the major influence over key strategic decisions. The *keiretsu* have been crucial in engendering greater market competition. The competitive advantage of the core manufacturer's products rests upon the *keiretsu's* ability to develop high value-added products, improving their quality, and cutting costs. This has been increasingly achieved by outsourcing more parts and components through its supply chain, coupled to greater co-operation and pressure with favoured subcontractors. Supply chain members' ability to develop parts of high quality and low cost, more than ever, determines the competitive advantage of final products by core manufacturers. Now market competition is amongst *keiretsus* and the performance of a *keiretsu* as a whole decides on the market winner (see, for example, Asanuma, 1988, 1989, and 1991). Core manufacturers depend on member companies just as member companies depend on core manufacturers.

In this heightened competitive situation, SME members of supply chains have had to increase their capacity to develop parts and components within the quality, cost, and lead-times specified by the core manufacturer, who expects continuous cost reduction and quality improvement after production starts. Suppliers that do so get a greater share of orders within the supply chain and thus a greater share of profits. Failure results in losing business. This has forced SMEs within supply chains to increasingly learn the advanced management skills and cost control techniques from core manufacturers to survive. SMEs outside a *keiretsu* have had to do likewise to compete with their counterparts inside such chains. This context helps explain the somewhat unexpected results showing that SMEs had adopted the cost management skills and techniques of larger manufacturers.

XYZ was a small subcontractor within a *keiretsu* living on its wits. It constantly faces pressures for cost reduction and innovation to survive. It has a simple technology, low value-added activities, and personalised controls emanating from its President. Lifetime employment and company welfare systems have always been an infeasible economic luxury. SMEs played a key role in Japanese economic development, being highly competitive within and amongst supply chains. Many created unique technologies which larger core manufacturers could not develop. Now many face a bleak future. Automation, comparative costs, a changing international division of labour, and shifts in Japanese consumer tastes towards imports, are forcing Japanese industry to restructure. This is leading to changes in many SMEs. Growing economic pressures within *keiretsu* have rendered many SMEs marginal and pushed them out of business (Ozawa, 1991). SMEs without advanced technological and managerial skills have great difficulty in surviving. XYZ is such an example.

Nevertheless, SMEs remain important to the Japanese economy and the international competitiveness of its manufacturers.[13] The remaining firms studied were more typical of prevalent managerial and cost management practices. These fell between the extremities outlined above with respect to XYZ and Nippon Water. They had varied but conventional product costing and budgeting systems supplemented by cost management practices involving JIT, and target and *kaizen* costing. Their costing systems mirrored those of large Japanese manufacturing firms. These results were somewhat contrary to the researchers' prior expectations of simpler, cruder systems: instead they found a high degree of cost awareness and sophisticated cost management systems. Related, and equally unexpected, these were underpinned by other features held in common with larger Japanese firms, including lifetime employment practices, a commitment to continuous improvement, integrative managerial processes, investment in science and engineering, and a desire to concentrate on high value added activities. These were unexpected results in that the effects of the new pressures within *keiretsu* had permeated to SMEs quicker and more extensively than had been anticipated.

Evidence of costing changes abounded in firms studied other than XYZ and Nippon. However, it would be wrong to assume that the changes were discontinuous or revolutionary or that the firms were beseiged by crisis: quite the converse—extant management methods were highly valued and hence retained. Strategies to cope were perceived as being in hand. Modest changes were afoot, including costing having greater centrality within management processes. Similarly, while lifetime employment was not being overthrown, thought was being given to its modification. Moreover, most firms had responded to cost pressures by action within secondary labour markets and relocating production overseas[14] rather than substantially changing management systems. The more exposed firms were to international competition, the more they questioned the adequacy of their cost management and the greater their willingness to experiment.

This is producing a tension between traditional Japanese practices of lifetime employment since World War Two and the pressures for profitability within heightened global competition. The role of lifetime employment in Japanese competitiveness is often not well understood. As pointed out above, lifetime employment has not been overthrown in the firms studied—it was perceived as crucial for keeping production competitive. In Japan, skilled versatile shop-floor workers have maintained effective production. Their involvement in JIT, TQC and Small Group Activities facilitate quality improvement, cost reduction, and lean production. Lifetime employment, together with pay systems that reward higher skills with higher pay has been an indispensable incentive for workers to improve their skills and participate in these processes. In a working environment of assured positions, coupled to the difficulties of finding comparable employment in the case of company failure, workers are motivated to concentrate their attention and energy in these directions (Aoki, 1988; Koike, 1988, 1991). Viewed in such a light, the reluctance of the firms studied to abandon lifetime employment may be understandable.

Several previous studies of Japanese management accounting emphasise cultural reasons for differences to the West, drawing attention to the Japanese emphasis on harmony and collectivism (Hunt and Targett, 1995; Chow et al., 1996). Such studies are valuable but they are essentially static and do not take account of the interplay between economics, institutions, beliefs, and actions. We have tried to demonstrate above that economic and institutional changes within Japan are also essential for an understanding of accounting changes in Japan as elsewhere (Mroczkowski and Hanaoka, 1989). Nevertheless, we would counsel against economic determinism in these matters. Japanese large companies typically have operated in rapidly changing industries such as automobiles, electrical and electronic machinery, computers, and semiconductors. For Japanese companies, speed and flexibility of response, along with attitudes toward competition described by Robin Cooper (1995) as 'confrontation', are indispensable facets of competitiveness. A common business principle for problem solving is 'first come, first served'. Japanese companies show signs of adapting to the economic changes quickly and are developing systems that retain their inherent abilities of flexibility and speed while addressing the new financial pressures.

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[13] See for example, Whittaker, 1994, for a more detailed exposition of economic and business problems of SMEs.

[14] Several industrial relocations by companies studied were not just reactions to comparative cost advantage but also to labour shortages within Japan, which has had exceptionally low levels of unemployment. However, this is currently increasing. Whether it will continue to do so is difficult to predict given the problems of the ageing Japanese population.

This does not necessarily mean that Japanese companies will continue to be unconcerned about the Western practices such as divisional performance measures, more sophisticated capital budgeting, individualised control and reward systems. As has been pointed out, such measures of profitability are being introduced more widely (Yoshikawa, 1997, Schmidt, 1996). For example, 40% of Sony Corporation's shareholders are now foreigners (*Financial Times*, 10 March, 1999) and Sony has had to be sensitive to shareholder value. Their new system reflects an awareness and ability to respond to these pressures. However, the incorporation of Western practices into Japanese management accounting systems is best seen as a continuation of a tradition of adopting foreign management techniques to Japanese circumstances and competitiveness strategies rather than a dramatic discontinuity in practice. Moreover, there is increasing evidence that many Western companies are adopting some Japanese management methods, including accounting ones but with modification to local conditions. The research issue may not only be the distinctiveness of between Western and Japanese management accounting systems, but rather the shared contingent pressures towards greater convergence under global competitiveness. While there are signs of convergence, there are clear limits to this process, depending on a mix of cultural and institutional factors.

Institutional changes associated with regulatory and accumulation pressures are as dynamic and significant for accounting changes in Japan as elsewhere (Mroczkowski and Hanaoka, 1989). Dynamic changes in Japanese management systems in response to socio-economic changes are not new. For example, contemporary Japanese management systems (including cost management) based on 'Toyotism' did not begin to supplant Tayloristic systems until the late 1960s following major industrial relations changes (Peck and Miyamachi, 1994). Japanese management accounting is in constant flux and is highly contingent. However, it is constrained by notions of economic reasonableness as well as Japanese ways of life and conducting business. It needs to be studied in such a light.

**Appendix**
**Company details**

| *Company name* | Capital | *Size (Yen millions)*<br>Sales | Employees | *Ownership* | *Foundation* | *Products* | *Markets* | *Production technology* |
|---|---|---|---|---|---|---|---|---|
| 1. Apollo Electric | 4,573 | 29,423 | 1,282 | 40% family, 50% mother co. Semi-independent | 1969 | Semiconductors, resistors, capacitors | International, V. competitive | High automation, small/large batch |
| 2. ASO Cement | 3,080 | 43,000 (cement, 30,000) | 1,783 | 30% family; 70% other institutions. Independent | 1872 | Mainly cement and cement products | Domestic. High barriers to entry | Automated. Mainly process |
| 3. Nishiki | 100 | 6,900 | 455 | Family owned. Independent | 1922 | Paper diapers and baby products | Domestic. Semi-protected and predictable | Manual. Small batch |
| 4. Fukuoka Cloth | 94 | 3,500 | 100 | 56% family owned. Independent | 1963 | Domestic and power cable tapes | Domestic. Semi-protected | Low automation. Small batch. |
| 5. Kyushu Hitachi Maxcel | 200 | N.A. | 404 | 100% owned by parent. Claimed independence | 1970 | Domestic electrical appliances | 75% domestic. Increasing competition | Multiple short assembly lines. Semi-automation. |
| 6. Midco (Anon.) | 500 | 14,000 | 480 | Not known. Dependant within *Keiretsu* | 1974 | Vehicle components | Domestic. V. competitive | High automation. Small batch |
| 7. Mitsumi Kyushu | 800 | 17,700 | 660 | 100% family owned. Independent | 1968 | Electronic parts. eg. coils, switches, discs, convertors | International. V. competitive | Low automation. Small batch |
| 8. Maruto Sangyo | 370 | 18,100 | 400 | 1/3 family, 1/3 employees, 1/3 others. Independent | 1939 | Food packaging | Domestic. Emerging foreign competition | High automation. Small to large batch inc. process |
| 9. Nippon Water Science (Anon.) | 12 | N.A. | circa 100 | Owner controlled. Independent | 1985 | Research and development services for shipping and marine industries | Domestic. Competition difficult to judge | Laboratories |
| 10. Noritaka Diamond Co. | 300 | N.A. | circa 300 | 100% owned by parent. Independent | 1973 | Industrial diamonds | International Growing competition | Low automation. Jobbing/small batch |
| 11. Seiko Electric | 2,323 | 19,380 | 620 | Highly dispersed ownership. 10% family owned. Independent | 1921 | Electronic control systems | Domestic. Low competition | High automation. Jobbing/small batch |

## References

Aera, (1997). 13 January: 14–20.

Amin, A. (ed.), (1994). *Post-Fordism: A Reader*. Oxford: Blackwell.

*Accounting, Auditing and Accountability Journal*, (1990). Dedicated issue on Japanese accounting, Jinnai, Y. and McKinnon, J. (eds.), 3 (2): 3–65.

Aoki, M. (1988). *Information, Incentives, and Bargaining in the Japanese Economy*. Cambridge University Press.

Asanuma, B. (1988). 'Japanese manufacturers-suppliers relationships in international perspective: the automobile case'. Working paper No. 8, Faculty of Economics, Kyoto University.

Asanuma, B. (1989). 'Relations between manufacturers and suppliers in Japan', in *Small and Medium-sized Firms in Japan*, Tsuchiya, M. and Miwa, Y. (eds.). Tokyo: Tokyo University Press.

Asanuma, B. (1991). 'Co-ordination between production and distribution in a globalizing network of firms: assessing flexibility achieved in the Japanese automobile industry', in *The Japanese Firm: The Sources of Competitive Strength*, Aoki, M. and Dore, R. (eds.). Oxford University Press.

Bromwich, M. and Bhimani, A. (1994). *Management Accounting: Pathways to Progress*. London: CIMA.

Chow, C., Shields, M., Kato, Y. and Nakagawa, M. (1991). 'Management accounting practices in the US and Japan: comparative survey findings and research implications. *Journal of International Financial Management and Accounting*, 3 (1): 61–77.

Chow, C., Kato, Y. and Merchant, K. (1996). 'The use of organizational controls and their effects on data manipulation and management myopia: a Japan vs US comparison'. *Accounting, Organizations and Society*, 21 (2/3): 175–192.

Cooper, R. (1995). *When Lean Enterprises Collide: Competing Through Confrontation*. Boston: Harvard Business School Press.

Currie, W. L. and Seddon, J. J. M. (1992). 'Managing AMT in a Just-in-Time environment in the UK and Japan'. *British Journal of Management*, 3 (3): 123–136.

Diamond Harvard Business Review (1996). April–May: 6–53.

*Economist* (1997), 11 January, pp. 19–21.

*Economist* Guide (1990). *Japan*. London: Hutchinson.

Hiromoto, T. (1988). 'Another hidden edge: Japanese management accounting'. *Harvard Business Review*, July–August: 22–26.

Hopper, T. and Joseph, N. (1995). 'The dissection of a dinosaur: experiments in control at Toyota'. *Management Accounting (UK)*, May: 34–38.

Hoshi, T. (1994). 'The economic role of corporate grouping and the main bank system', in Aoki, M. and Dore, R. (eds.), *The Japanese Firm—The Source of Competitive Strength*. Oxford University Press.

Hunt, B. and Targett, D. (1995). *The Japanese Advantage?* London: Butterworth-Heinemann.

Itoh, M. (1992). 'The Japanese model of post-Fordism', in *Pathways to Industrialisation and Regional Development*, Storper, M. and Scott, A. J. (eds.). London: Routledge: pp. 116–134.

JETRO—Japan External Trade Organisation (1993), *Meeting the Challenge: Japanese Kaisha in the 1990s*. Tokyo: JETRO.

Johnson, C. (1982). *MITI and the Japanese Miracle*. Palo Alto, Cal: Stanford University Press.

Kenney, M. and Florida, R. (1988). 'Beyond mass production: production and the labor process in Japan'. *Politics and Society*, 16: 121–158.

Kigyou-Kaikei, (1995). 47 (2): 44–65.

Koike, K. (1988). *Understanding Industrial Relations in Modern Japan*. London: Macmillan.

Koike, K. (1991). 'Learning and incentive system in Japanese industry', in *The Japanese Firm: The Sources of Competitive Strength*, Aoki, M. and Dore, R. (eds.). Oxford University Press.

Kondo, D. (1990). *Crafting Selves: Power, Gender and Discourses in the Japanese Workplace*. Chicago: University of Chicago Press.

Lipietz, A. (1992). 'Post-Fordism and the international debate around Toyotist Japan'. *Kansai University Keizai Ronshu*, 42 (1): 99–115.

McMann, P. J. and Nanni, A. J. (1995). 'Means versus ends: a review of the literature on Japanese management accounting'. *Management Accounting Research*, 6 (4): 313–346.

Monden, Y. and Sakurai, M. (eds.), (1989). *Japanese Management Accounting: A World Class Approach to Profit Management*. Cambridge, Mass: Productivity Press.

Moyes, J., Mitchell, F. and Yoshikawa, T. (1991). *A Review of Japanese Management Accounting Literature and Bibliography*. London: CIMA.

Mroczkowski, T. and Hanaoka, M. (1989). 'Continuity and change in Japanese management'. *California Management Review*, 26 (Winter): 36–48.

Nishizawa, O. (1998). *Bunsha Keiei no Kanri-Kaikei*, Tokyo: Chuokeizai Publishing Co.

Odagiri, H. (1992). *Growth Through Competition, Competition through Growth*. Oxford University Press.

Ozawa, T. (1991). 'Japan in a new phase of multinationalism and industrial upgrading: functional integration of trade, growth and FDI'. *Journal of World Trade*, 25: 43–60.

Peck, J. and Miyamachi, Y. (1994). 'Regulating Japan? Regulation theory versus the Japanese experience'. *Environment and Planning D: Society and Space*, 12: 639–674.

Sakurai, M. (1996). *Integrated Cost Management: A Companywide Prescription for Higher Profits and Lower Costs*. Cambridge, Mass: Productivity Press.

Sakurai, M. (1990). 'The influence of factory automation on management accounting practices: a study of Japanese companies', in Kaplan, R. S. (ed.), *Measures for Manufacturing Excellence*. Boston: Harvard Business School Press, pp. 39–62.

Scarbrough, P., Nanni, A. J. and Sakurai, M. (1991). 'Japanese management accounting practices and the effects of assembly and process automation'. *Management Accounting Research*, 2 (1): 27–46.

Schmidt, R. J. (1996). 'Japanese management, recession style'. *Business Horizons* (March/April): 72–74.

Sony Corporation (1994). *Revolution on Management Structure*. Tokyo: Sony Corporation.

Whittaker, D. (1994). 'SMEs, entry barriers, and "strategic alliances" ', in Aoki, M. and Dore, R. (eds.), *The Japanese Firm—The Source of Competitive Strength*. Oxford University Press, pp. 154–177.

Yamada, T. (1991). *The Regulation Approach*. Tokyo: Fujiwara-shoten.

Yoshikawa, T. (1996). 'Fostering management accounting development in medium sized companies'. Paper to EIASM Seminar on Advanced Management Accounting Practices, Oct., Paris.

Yoshikawa, T. (1997). 'A study on cost management through new production system development', *Asian Productivity Journal*, Winter: 1–22.

Yoshikawa, T., Innes, J. and Mitchell, F. (1989). 'Japanese management accounting: a comparative survey', *Management Accounting (UK)*, November: 20–23.

Yoshikawa, T., Innes, J., Mitchell, F. and Tanaka, M. (1993). *Contemporary Cost Management*. London: Chapman and Hall.

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# Book Reviews

**Cost management and its interplay with business strategy and context.** *Alf Oldman* and *Cyril Tomkins*. Ashgate xvi + 296 pp. £42.50 hardback.

This book is the outcome of a long-term research project between Alf Oldman, a senior consultant, and Cyril Tomkins, a well-known British academic. It addresses a seemingly simple though largely unexplored question: the extent to which six new management accounting techniques (e.g., target costing, activity-based costing, kaizen costing, theory of constraints, shareholder value analysis, and balanced scorecards) are supportive of firms' strategy in today's business. Drawing on the Gordon and Miller's (1976) contingency model for the design of accounting systems, the authors investigate if such model is linked to their proposal of four cost reduction archetypes, namely: continuous process improvement, continuous market innovation, product pruning, and radical innovation.

In common with the Relevance Lost School (e.g., Johnson and Kaplan, 1987), the book is informed by the transaction cost economic literature. Accordingly, the book places considerable emphasis on cost reduction issues and has strong theoretical links to the Strategic Management Accounting literature. Empirical evidence supporting this project was gathered from five companies (e.g., Stoves plc, Abbey National plc, Rank Xerox Limited, Normalair-Garrett Limited, and Thorn Lighting plc), which the authors regard as firms that develop 'best (or, at least, good) practice' (p. 23).

The book is organised into one executive summary, three main parts, and two appendices. The executive summary outlines the theoretical foundations of the project and provides the reader with a list of its 10 main findings. The research objectives and design are described in the first main part of the book. In this part, the authors clarify some crucial notions developed by the strategic management and the management accounting literatures, such as market-driven vs technology-driven cost management systems, target costing vs cost-plus approaches, and the intellectual foundations of different cost management approaches. This analysis leads the authors to their above mentioned proposal of four cost reduction archetypes, which are the outcomes of both firms' (strong/weak) turnaround need and their (strong/weak) market orientation. The potential usage of the six new cost management accounting techniques under consideration is then explored for each of the four cost reduction archetypes, and this in turn provides the foundation for the development of the three theoretical propositions that guide the analysis. This part also reports on methodological issues, companies' selection criteria, and the software package used to analyse field study interviews.

Part II comprises about two thirds of the book's total length, and thus constitutes its core section. The description of the five cases follows a common structure for each firm: history, environment and business strategy (including products and markets); description of the main organisational characteristics (including the research and development policy); decision style, cost management strategies and how each individual case relates to the strategic archetypes, and cost management tools and how they relate to the strategic archetypes found in the case. By drawing both on the vast amount of data gathered from the field studies and on the systematic search, gathering and analysis of publicly available information about firms (e.g., newspaper articles, financial statements), the authors provide the reader with rich information about the firms' characteristics.

Part III outlines the conclusions of the investigation. An interesting finding is that in all the five cases, the firms experience transitional stages towards a state of continuous market innovation. That is, towards an archetype characterised by the absence of firms' turnaround needs as well as by a strong market orientation. The transitional stages, the authors contend, involve two main, exclusive routings: continuous process improvement or radical innovation. Continuous process improvement—no turnaround need of firms and weak market innovation. Radical innovation—strong turnaround needs and strong market orientation. The authors derive an overall conclusion from this finding; organisational best practice is not captured by one archetype. Conversely, organisational best practice is largely contingent on the concrete historical period that one firm undergoes. The authors also show some relevant results on the management accounting techniques that inform cost reduction decisions for both future and current products. For the latter products, they observe that market-driven businesses use the notion of target costing. Whereas the authors find support for the notion that cost reduction decisions involving current products are largely informed by the theory of constraints. The book also includes two short appendices. Appendix A outlines the underlying assumptions of the extended four-state cost management model. Appendix B comprises a definition list of the main notions used in the investigation (e.g., continuous improvement, theory of constraints).

A few minor issues, however, gave me pause when reading the book. First, there is insufficient emphasis on the technical side of things. Though this is understandable in order to curtail the book's length over the usual standards, potential readers of the book may not be up to date with each of the recent management accounting techniques under analysis. Second, the chapter on research objectives and design certainly provides a fair depiction of the theoretical and methodological issues on which the investigation is based. However, the arguments developed in that chapter are too abstract at the outset of the book, especially for practitioners. Third, some of the management accounting techniques under consideration may fairly be regarded as fashions. The authors might wish to take a more critical stance towards such techniques, and address also their legitimating effects, in forthcoming editions of the book. Fourth, the authors might also wish to develop comparisons of some interest between "best-practice firms", such as those reported in the book, and companies whose management practices are not so much *avant-garde*. Finally, a number of editing problems may be easily resolved in future editions of the book: missing references (e.g., Oldman, 1997; see footnote 80, Chapter 1); incomplete references (e.g., Otley, 1994, which seems to miss Berry, see page 25); repetition of end-chapter notes (e.g., notes 24 and 52 in Chapters three and four, respectively); missing index of contents; and, finally, extensive use of end chapter notes, which in turn makes reading somewhat messy by having to go to the end of the chapter to read the note and then to the bibliography list to see the reference.

Overall, this is a well organised, clearly written book which is accessible to its target audiences: practitioners and researchers. Practitioners will find interesting the quality and richness of research data collected as well as the informing theories of the book, such as those of Kaplan. Researchers may benefit from a well-designed and conducted field-study investigation. In this respect, the book may be helpful for doctoral courses addressing field-study in any of the areas of business research.

## References

Gordon, L. and Miller, D. (1976). 'A contingency framework for the design of accounting information systems'. *Accounting, Organizations and Society*, 1 (1): 59–70.

Johnson, H. T. and Kaplan, R. (1987). *Relevance Lost: The Rise and Fall of Management Accounting*. Cambridge, MA: Harvard Business School Press.

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# FRS3 and analysts' use of earnings

## Richard G. Barker*

**Abstract**—This paper examines analysts' use of earnings information and draws implications for the stock market role of the financial reporting regulator. Evidence from participant observation and from interview research suggests that: first, analysts treat the announcement of earnings with immediacy and importance and, further, they make use of the components of FRS3 in extracting a measure of 'normalised' earnings; second, analysts do not, however, have a rational economic incentive to regard accounting information as their exclusive (or even their primary) focus of interest, and therefore financial statement analysis is not necessarily their core competence; third, analysts' interpretation and use of earnings information is rather superficial, and there is limited understanding of underlying issues of recognition and measurement, and also of the interactions between earnings and the balance sheet. Overall, the analysis suggests an important role for the financial reporting regulator in compensating for analysts' inherent 'disinterest' in accounting. Financial reporting standards must be designed such that their actual content is consistent with the analysts' (uninformed) expectations of this content, otherwise the analysts' limited understanding will generate false assumptions and, thereby, unintended real effects on share prices.

## 1. Introduction

Prior research of earnings usage addresses both the value-relevance of earnings and the market expectations role of analysts' earnings forecasts. There is, however, a striking absence in the literature of a behavioural study which examines directly analysts' usage of earnings information, taking into account the contextual reasons for this usage and the associated method and depth of analysis. Additionally, the behavioural literature does not address the policy-relevant issues of, first, how analysts interpret the information generated by a specific reporting standard (in this case FRS3) and, second, what implications this has for improving the relevance to valuations of regulated information.

In addressing these issues, this paper provides both a confirmation and an extension of prior research. Using a behavioural methodology, the paper supports the findings of the market-based literature with respect to the market's efficient response to earnings news, the market expectations role of analysts' earnings forecasts and the greater explanatory power in share price models of permanent (as opposed to transient) earnings. These findings are then extended by means of using participant observation and semi-structured interviews to explore in greater depth analysts' use of earnings information. The paper finds that earnings (and accounting data generally) play only a limited role in the analysts' information environment, with the effect that analysts have a limited understanding of the structure and valuation-relevance of the financial statements, and also of the content and impact of financial reporting standards. Importantly, however, this does not necessarily represent a failing on the part of the analysts but is, rather, a natural consequence of the economic environment in which they operate. A manifestation of this environment is that analysts themselves have limited regard for the accuracy of their earnings forecasts, because this is not something which differentiates between them in the eyes of their fund manager clients (and it is therefore not central to their income generation).

Section 2 of this paper provides background information on earnings: Section 2.1 reviews how, in theory, accounting earnings are relevant to share price determination; Section 2.2 examines how, in practice, accounting earnings are measured and presented under the ASB's FRS3; and Section 2.3 then reviews the empirical literature with regard to, first, the value-relevance of earnings and, second, analysts' use of earnings. Section 3 outlines briefly the research questions emerging from Section 2, and Section 4 then introduces the dual research methodology used in the paper, which is participant observation and semi-structured interviews. Section 5 reports the findings from participant observation, which focus on a process flow model of the context and motivation for analysts' use of earnings. This is followed in Section 6 by the interview evidence on analysts' method of usage of FRS3 earnings information. Finally, Section 7 concludes the paper by drawing implications for the role of the ASB in the stock market.

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## 2. Earnings: theory and practice

### *2.1. The value-relevance of earnings*

An assessment of analysts' interpretation and use of FRS3 information requires a theoretical benchmark of how earnings *ought* to be used in the valuation of shares. In an 'ideal world', analysts would focus on economic earnings, which are given by the change in the economic value of capital (plus dividends) between the beginning and end of a period (Hicks, 1946). *Ex post*, economic earnings may be regarded as comprising a transitory and a permanent component. Transitory earnings affect future earnings in so far as they change the value of capital employed, though they are not in themselves 'ongoing'. Permanent earnings, by contrast, are defined to be the annual level of economic earnings in perpetuity that is jointly implied by the share price and the shareholders' required rate of return. Alternatively stated, the ratio of share price to permanent earnings is equal to the reciprocal of the shareholders' required rate of return. This property of permanent earnings makes them a natural focus for equity analysts in the evaluation of share price.

Accounting earnings are superficially consistent with their economic counterpart. They are measured as dividends plus the change in the book value of capital during a period (assuming full articulation), and they incorporate transitory components in the form of exceptional and extraordinary items. As is well known, however, incomplete and imperfect markets imply that there is no functional relationship in *theory* between book value and economic value.[1] In *practice*, also, accounting earnings are distorted by the combined effects of: first, subjectivity in the application of accruals accounting; second, delayed recognition of holding gains, caused by adherence to the realisation principle; and, third, the loss of full articulation, caused by gains and losses being taken directly to reserves. In short, there are both theoretical and practical reasons why accounting earnings are an unreliable proxy for economic earnings, and why there is therefore no functional relationship between accounting earnings, share price and shareholders' required rate of return.

Accounting earnings do, however, have the property of value-relevance in so far as they can be used as a basis for predicting future accounting earnings, and thereby future dividends and current share price (Beaver, 1998). These valuation links are made explicit in the abnormal earnings valuation model (Peasnell, 1982 and Ohlson, 1991), although the model is silent on the method of accounting that best identifies permanent earnings.

This brief discussion suggests that a central ASB policy issue is how, in the absence of a measure of permanent economic earnings, the recognition, measurement and disclosure of accounting earnings can be such that (when used by analysts) their value-relevance is maximised.

### *2.2. FRS3—the reporting of earnings in the UK*

While issues affecting the recognition and measurement of earnings are ubiquitous in the ASB's work, the regulation of disclosure and presentation is focused in FRS3, *Reporting Financial Performance* (ASB, 1992). The stated objective of FRS3 is 'to highlight a range of important *components of financial performance* to aid users in understanding the *performance achieved* by a reporting entity in a period and to assist them in forming a basis for their *assessment of future results*' (ASB, 1992, para. 1, italics added).

There are three main ways in which FRS3 aims to highlight important components of financial performance. The first is the division of operating performance into activities that are either acquired, continuing or discontinued. The second is the reporting of exceptional items both above and below operating profit and, in the latter case, in three specific categories—concerning the profit or loss on the sale or termination of a business, the profit or loss on fixed asset disposal, and reorganisation and rationalisation costs. The third is the reconciliation of earnings to changes in reserves, by means of the statement of total recognised gains and losses and the statement of movements in shareholders' funds.

The focus of FRS3 on information that is relevant to users is tempered by considerations of information reliability. Four issues are important here. First, companies are disallowed from making provisions for the sale or termination of an operation unless they are demonstrably committed to it, and they are also disallowed from reporting an activity as discontinued unless it satisfies tight criteria concerning timing, nature and separability. Second, companies are effectively disallowed from reporting extraordinary items. Third, companies are required to report an 'all-inclusive' measure of earnings per share (eps), with their own version of 'normalised' eps being optional. Fourth, and finally, historic cost earnings should be disclosed if it differs materially from reported earnings.

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[1] See Beaver and Demski (1979) and, more broadly, Parker, Harcourt and Whittington (1986).

Overall, FRS3 appears to be consistent with the discussion in Section 2 above. The profit and loss account is given an emphasis on ongoing, trading performance, and users are able to exclude discontinued operations and 'one-off' exceptional items from their measure of permanent earnings (see IIMR, 1993). At the same time, FRS3 achieves full articulation by means of the statement of total recognised gains and losses, thereby ensuring that all aspects of financial performance for the period are disclosed with equal prominence.

### *2.3. Empirical evidence on the use of reported earnings*

Having reviewed briefly the theory of the value-relevance of earnings (Section 2.1) and the practice of earnings disclosure (Section 2.2), the final foundation for this paper is to review the empirical evidence with respect to: first, whether (and in what respect) accounting earnings have been shown to be value-relevant; and, second, the role of analysts in using earnings information in the determination of share prices.

It is well established that accounting earnings are value-relevant (see, for example, Beaver, 1998, and White, Sondhi and Fried, 1997, for a literature review). Moreover, and consistent with the argument in Section 2.1 above, measures of permanent accounting earnings have considerably greater explanatory power than their unadjusted counterparts (see Lev, 1989). Methods of proxying permanent earnings have included: the introduction of an earnings level variable to allow for transience in earnings changes (Ohlson, 1991, Easton and Harris, 1991, and Strong, 1993); the calculation of firm-specific measures of earnings persistence (Kormendi and Lipe, 1987, Collins and Kothari, 1989, and O'Hanlon et al., 1992); and the disaggregation of accounting earnings into permanent and transitory components (Strong and Walker, 1993, and see also O'Hanlon and Pope, 1997).

With regard to the role of analysts in share price determination, studies of analysts' earnings forecasts have shown them to be more accurate than those generated by time series models (Bhaskar and Morris, 1984, Brown et al., 1987a, and O'Brien, 1988), and accuracy is reported in Horton et al. (1998) to have improved following the introduction of FRS3. Analysts' earnings forecasts have shown to be superior measures of price-impounded earnings expectations (Fried and Givoly, 1982, Brown et al., 1987b, and see also Schipper, 1991), and they have also been used successfully to derive measures of earnings persistence (Easton and Zmijewski, 1989, and Parkash, 1995). The literature has raised doubts, however, with respect to the efficiency with which analysts use available information (see, for example, Lys and Sohn, 1990, de Bondt and Thaler, 1990, Abarbanell, 1991, Elgers and Murray, 1992, and Capstaff et al., 1995). In this context, predictive power for earnings has been demonstrated for earnings components (Fairfield et al., 1996) and also for non-earnings financial statement information (Ou and Penman, 1989, and Abarbanell and Bushee, 1997).

While the market-based research methodology has dominated investigation of the price-earnings relationship, both in terms of volume of work and usefulness of findings, other methods have also been used to address the issue. Survey research, for example, has identified the dominance of the price-earnings ratio as a valuation method (e.g., Lee and Tweedie, 1981, Arnold and Moizer, 1984, Pike et al., 1993, and Barker, 1999). This finding was supported by laboratory experiment (Day, 1986), and also by content analysis of analysts' reports (Govindarajan, 1980, and Previtts et al., 1994). The paper by Previtts et al. also identified a focus on the assessment of earnings 'quality', using both financial and non-financial information. Finally, survey and laboratory experiment studies have questioned the ability of analysts to interpret and use financial statement information (Lee and Tweedie, 1981, and Breton and Taffler, 1995, respectively).

## 3. Research questions

The discussion of FRS3 in Section 2.2 above raises questions in two broad areas, which are (at best) incompletely answered, either in theory (Section 2.1) or empirically (Section 2.3). These areas are the *context* within which earnings information is used by analysts and the actual *method of usage*. Both of these areas concern how and why FRS3 is useful to analysts and, further, the ways in which its information content might be improved.

As to context, it is difficult to address specific issues concerning FRS3 without having a broad, first-hand understanding of when, how and why analysts react to earnings information in the way that they do. This encompasses: the aims of analysts with respect to earnings information; the timing and nature of their response to earnings news; the importance of earnings relative to other types of information; and the subsequent use of earnings information for forecasts and other purposes. In short, why do analysts care about earnings and what motivates their use of earnings information?

Concerning method of usage, the discussion so far has suggested the following questions. First, how is each of the components of FRS3 interpreted and used by analysts? Second, what are the implications of the trade-offs made by FRS3 between information relevance and reliability? Third, how well do analysts understand and interpret FRS3 information, and is this consistent with the assumption of the 'informed user' (ASB, 1999)?

Taken together, these questions of context and usage concern the role of analysts as a mechanism by which FRS3 earnings information is impounded in share prices. Empirical answers to the questions will therefore be informative of the ASB's role in the stock market.

Empirical evidence is presented in Sections 5 and 6 below, after first outlining in Section 4 the paper's research methodology.

## 4. Research design and sample description

This study employs two research methodologies: participant observation and semi-structured interviews. These were designed to be mutually reinforcing, with each methodology complementing the other in its scope for the extraction and interpretation of data.[2] As both are predominantly qualitative methodologies, however, they place an onus on the researcher to filter and interpret data subjectively.

Sampling was based upon identifying the firms of analysts that are of greatest importance in the determination of share prices. The Extel survey (Extel, 1994)[3] showed clearly that a small number of firms of analysts are dominant in the market. More specifically, nine firms accounted for 87% of the total weighted votes in the survey in 1994 (88% in 1993). In view of the market dominance of these firms, there was considered to be little benefit in approaching analysts from elsewhere.

In the first instance, one of the largest of the nine firms was approached with a request to conduct participant observation. The request was successful, and a period of one month was spent with the UK equity research department of the firm in July-August, 1994. This involved working the same hours as the analysts in the same environment (although it did not involve working *for* the firm in any way). Unrestricted discussion and observation time was spent with analysts. A total of seven days was spent with different teams of analysts whenever a company in their specialist sector made a results announcement (see Section 5 below). Time spent also included, for example, a day spent on the sales desk watching (and taking notes on) activities including phone contact with clients, internal communication with analysts, and use of financial information systems. Similarly, considerable time was spent at internal briefing meetings, in informal conversations with analysts from across all sectors, and so on. During this process, an archive of data was built up. This included both personal notes and corporate documentation, with the latter consisting of documents for internal use as well as those for external circulation to clients. Finally, the period of participant observation was used as an opportunity to design and continuously improve the interview questions used in later research.

The participant observation provided first-hand experience of both the environment in which analysts operate and of the work that they do. While unavoidably subjective and restricted to a sample of one firm, this research was broadly informative in a way that would not otherwise have been possible (see also Gniewosz, 1990). Moreover, participant observation can be a valuable foundation for interview research in three ways (Jorgensen, 1989). First, its scope for familiarising the researcher with all aspects of the analysts' environment serves to minimise any misconception that the researcher might otherwise bring to interviews, thereby enhancing external validity. Second, it helps to identify specific issues that can be explained further by a focused interview approach. Third, it can serve to either corroborate or to challenge interview findings, not least because it is based on the researcher seeing what analysts actually do, rather than what they *say* they do.

The target sample for the interview research was the same nine leading City firms outlined above. A letter was written to the Head of Research at each of the firms, requesting the participation of UK analysts in a one-hour interview. Six of the nine firms agreed to take part in the research, and a total of 32 analysts were interviewed (see Table 1). All analysts who took part in the interviews were company/sector specialists, and none was a strategist or economist.

The interviews were designed to clarify, quantify and probe some of the findings of participant observation. This was useful in two ways. First, the interviews enabled the analysts to express in-depth opinions on predetermined issues, and also to respond to supplementary questions that sought clarity, consistency and full explanation. Second, while participant observation leads to general and qualitative findings, semi-structured interviews allow the construction of questions that seek quantifiably analysable responses (in addition to qualitative explanations of these responses). Against these benefits are the unavoidable weaknesses of interview research, such as ambiguity in the questions and bias (intended or otherwise) in the responses. These weaknesses were, however, minimised to the extent that the interviewees were a relatively homogenous sample, and that the interviews were focused clearly on a familiar and important aspect of their work. Also, and as described above, bias in questions, responses and interpretations were 'controlled' in so far as the interview research was guided and corroborated by the experience of participant observation.

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[2] See, for example, Mintzberg (1973), p.229.

[3] The Extel survey is the leading annual assessment of analysts by fund managers in the UK.

**Table 1**
**Sample description**

| Sector | *Participant observation* | *Semi-structured interviews* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *Total number of analysts at Firm A* | *Firm A* | *Firm B* | *Firm C* | *Firm D* | *Firm E* | *Firm F* | *Total interview* |
| Mineral Extraction | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Industrials | 9 | 2 | 3 | 2 | 1 | 0 | 1 | 9 |
| Consumers | 8 | 2 | 0 | 1 | 1 | 0 | 1 | 5 |
| Services | 8 | 1 | 0 | 1 | 1 | 2 | 0 | 5 |
| Utilities | 5 | 0 | 1 | 1 | 1 | 0 | 0 | 3 |
| Financials | 6 | 0 | 2 | 1 | 1 | 2 | 2 | 8 |
| Other | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| TOTAL | **40** | 5 | 6 | 6 | 5 | 5 | 5 | **32** |

In summary, the two research methods were consciously designed to be complementary, and they were felt to be an insightful approach to addressing the questions raised in Section 3 of this paper. Specifically, participant observation was aimed at understanding the *context* within which analysts use earnings information (see Section 5 below), while interviews were used to gain an understanding of the detailed *method of usage* of earnings (see Section 6 below).

## 5. Context of earnings usage

This section will focus on the findings of participant observation regarding the role of earnings information in the broad context of the analysts' working environment.

There was one strikingly clear focal point for analysts with respect to earnings, which was the corporate results announcement. Most public companies report earnings twice a year, in the form of interim and preliminary statements to the Stock Exchange. The great importance of these announcements was evident in both analysts' preparation for them and response to them. Regarding preparation, a rolling fortnightly calendar of significant anticipated news events was circulated to all analysts and all members of the equities sales team.[4] The most frequent event on the calendar was company results announcements (with other entries being the announcement of government statistics, and so on).[5] In advance of a specific set of results, analysts would often prepare a report for circulation to clients, together with a briefing for the sales desk.

As soon as the results are announced, typically when the market opens, there is always an immediate response. The results are assessed electronically, and printed out and skimmed over for evidence of any surprises. These might be a failure to meet expectations, or else some other unexpected news item with implications for the share price.[6]

Typically, the first thing to be noticed by the analyst is earnings. If they are in line with forecast (both the consensus and the analyst's own), then attention shifts elsewhere. If not, then there is a need to be able to explain why. This is usually readily done, and the explanation is fairly simple—for example, a large and unexpected provision, or an unanticipated recent change in trading conditions. The analyst might then make adjustments to earnings (see Section 6 below). These adjustments strike the observer as being superficial, although the observer is struck equally by the extent to which speed is of the essence. The analyst progresses as quickly as possible to broadcasting the results news to all concerned within the firm. The mechanism for this is a microphone in the middle of the trading floor. The analyst will always report actual earnings against his or her own forecast (though differences are rarely large). Further, in order to assess any likely price effect, the analyst always declares whether his or her forecast was high or low relative to the consensus. Then, the analyst conveys what are felt to be the salient news items in the announcement, such as a trading update or a proposed restructuring. This may take up to five minutes, and rarely longer. The sales team and the analysts themselves want to be the first to break the news to their fund manager clients, in order to maximise trading activity and commission income for the firm. They each have a prepared list of client contacts, which they proceed to work through. They have a close working relationship with some fund management firms, but not with others. The analyst remains in busy phone contact until the time comes (usually late morning) for the company's open meeting with all analysts. Here the pace slows down a little and there is more time for reflection, and for mixing with other analysts. This relaxation arises because most of the news will by now have been absorbed by the market. What follows is simply a 'fleshing out', with some limited scope to extract further useful information.

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[4] The UK equities department comprised three main groups: the research analysts themselves; the market makers, who actually executed trades; and the sales desk, who effectively intermediated between the analysts, the fund manager clients and (ultimately) the market makers.

[5] Other events included the official release of data such as retail sales, money supply growth, industrial production, unemployment, RPI, average earnings, trade balance, and so on. These news releases were broadcast to all in the firm as soon as they became available. It would have been highly unusual for them to have triggered any stock-specific immediate action. Rather, they typically represented incremental updates on the analysts' understanding of the broader economic environment. In contrast, government-sourced data at the industry level was more likely to 'provoke' a reaction. The most significant example was the announcement of the (unexpected) outcome of a regulatory review in a utility sector, which led to a share price collapse, accompanied by frenzied activity within the firm.

[6] See also Barker (1998).

Typically, the chief executive and the finance director of the company formally present and explain their results. This is followed by approximately a dozen questions and answers. Questions to the company tend not to be too insightful, not least because of the listening ears of competitor analysts. In the context of earnings, the focus of questions is on understanding exceptional items, provisions or other items that might affect earnings 'quality'. Finally, the rest of the analysts' day will be taken up with client contact, report preparation and direct phone contact with representatives of the company itself.[7] Earnings is rarely the dominant subject of these discussions. Indeed, reported earnings are now consigned to the historic record and are no longer of direct interest. An important indication of this (which will be explored further below) is that there was no *ex post* monitoring of forecast accuracy carried out by management within the firm.

Following the approach of Bouwman et al. (1987), this description of the analysts' reaction to the corporate results announcement may be summarised in a process flow diagram (see Figure 1).

There are three broad areas of consistency between the evidence above (summarised in Figure 1) and the existing literature. First, the analysts' rapid reaction to earnings information is consistent with the semi-strong form of the efficient markets hypothesis (Fama, 1970, and see Beaver, 1998, for a review of empirical evidence). Indeed, the analysts' initial reaction to news is characterised by speed rather than by reflection and deep analysis. In this efficient markets context, the evidence supports the finding of Hew et al. (1996) that there is no post-earnings-announcement drift for large UK companies; further, it is *also* consistent with the finding of Hew et al. that there *is* post-earnings-announcement drift for small UK companies. This is because the analysts restricted their attentions to large UK companies only, making it likely that the market might be transitorily semi-strong form inefficient with respect to small companies.[8] One analyst alone in the firm was responsible for the universe of 'small companies'.

The second area of consistency with the literature is that the evidence supports the use of analysts' earnings forecasts as proxies for market expectations (e.g., Brown et al., 1987b, and Schipper, 1991). This is seen by the implied definition of news as the difference between the analysts' forecasts and the realised performance.

Finally, the third area of consistency is that analysts adopt an 'expert' approach to the screening and use of new information. Bouwman et al. (1987) explain that a 'template' approach characterises the expert analyst, meaning that new information can be readily assimilated within a logically constructed body of extant knowledge.[9] Without this template (or 'expert base'), the volume of information in any given results announcement would cause the reader to be detained (or confused) in identifying the salient, value-relevant news.

By contrast, possession of a template allows the expert analyst to identify share price implications quickly. An example can be used to demonstrate this, and one such is the response of a chemicals analyst to a results announcement in his sector. The analyst in question identified immediately that the news element in the announcement was an 'update' on the position of the industry within the economic cycle. Specifically, evidence of both price increases and sales volume growth matched a centrally important pattern observed in previous cycles, and this realisation caused the analyst to ask the following question of the company at the analysts' meeting.

> 'Is the 9% increase in volume evidence of stock building (perhaps in anticipation of price increases) or is it genuine and sustainable?'

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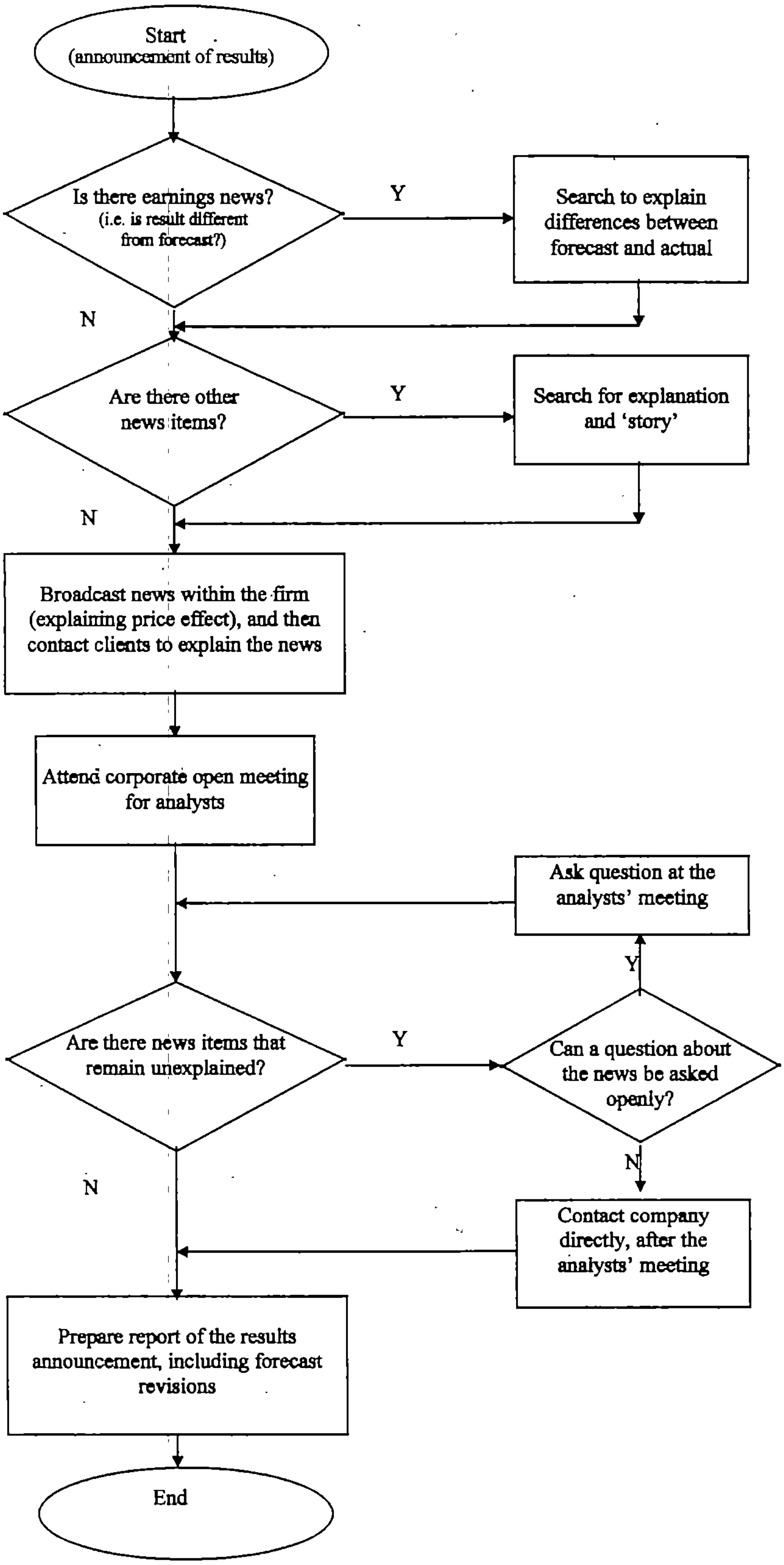
[7] Related to this, Holland (1998a, 1998b) presents evidence concerning the corporate side of the different channels of information disclosure discussed here.

[8] This restricted focus on large companies is consistent with the evidence of Bhushan (1989), Lang and Lundholm (1996), and others that firm size is a major determinant of analyst following.

[9] See also Clarkson (1962).

**Figure 1**
**Process flow chart of typical analyst's response to corporate results announcement**


Start
(announcement of results)
Is there earnings news?
(i.e. is result different from forecast?)
Y
N
Search to explain differences between forecast and actual
Are there other news items?
Y
N
Search for explanation and 'story'
Broadcast news within the firm (explaining price effect), and then contact clients to explain the news
Attend corporate open meeting for analysts
Ask question at the analysts' meeting
Y
Are there news items that remain unexplained?
Y
N
Can a question about the news be asked openly?
N
Contact company directly, after the analysts' meeting
Prepare report of the results announcement, including forecast revisions
End

This question would not have been obvious to the non-expert, who would probably have taken a combination of price increases and sales growth as unambiguously positive. To another expert at the analysts' meeting, however, the news was also both important and concerning, because it suggested stock-building by intermediate producers in advance of anticipated price rises, marking the peak of the cycle:

> 'Substantial price increases have been seen recently. Are we approaching a marked slowdown?'

These questions reflect an incremental use of news against a background of an expert understanding of the economics of an industry. They also show an interest in accounting information to the extent that it is informative with respect to future performance, and thereby to the share price. The questions are representative of many others that were asked at analysts' meetings. In total, 13 questions were asked of the company at the particular analysts' meeting from which these two quotes are taken. All of the 13 questions are listed for information and reference in the Appendix.

In addition to these three areas of consistency with the existing literature, two further findings suggest additional insight into the dynamics of the analysts' environment and into the relative informational importance of earnings. The first of these was the apparent superficiality of analysts' adjustments to reported earnings, and the second was the absence of *ex post* monitoring of forecast accuracy within the firm.

The earnings adjustments were entirely consistent with the IIMR's (1993) statement on headline earnings, which argues that the market needs a quick and approximate headline measure as a basis for an immediate share price reaction. In contrast to the IIMR's statement, however, there was little evidence of any subsequent, more sophisticated adjustment to reported earnings after the initial flurry of activity. Rather, once reported earnings news is (quickly) assimilated by clients and by the market, it becomes part of the historic record and, while relevant to the revision of earnings forecasts (and prospective PE ratios),[10] it is not *itself* relevant to future share price changes. This is also true of the report and accounts themselves, which were used infrequently by analysts in their daily work.

Along similar lines, the irrelevance to share prices of the accuracy of an 'old' forecast partly explains the absence of *ex post* monitoring of forecast accuracy. A further reason was the perception that there was rarely much divergence between any given analyst and the consensus forecast.[11] This implies that forecast accuracy is not in itself a unique selling point for analysts, because it does not differentiate between them in the eyes of fund manager clients.[12] Indeed, a more general statement is that the usefulness of the analyst's service to fund manager clients is not closely correlated with forecast accuracy per se, but rather with broader considerations of the 'quality' of advice (Barker, 1998).[13] Similarly, and as argued by Bouwman et al. (1995), accounting information can serve the purpose of an initial screening of potential equity investments, but it is far less useful in the detailed forecasting of future business performance.

This leads to perhaps the most important observation about the context within which earnings information is used by analysts, which is that the underlying reason for the apparent superficiality accorded to earnings and to earnings forecast accuracy is that accounting ability is only one aspect of an analyst's role, and it is notably not the most important. An analyst needs to be able to understand the industry and to interpret the importance of news items within the industry, such as an oil discovery, a law suit, a price war, the impact of a merger on competition, and so on. Moreover, the analyst must be able to communicate with clients in order to persuade them to trade, and thereby to generate commission income for the firm. Any given analyst may have a core competency in any of these areas, and it may or may not be in accounting.[14] In other words, the announcement of earnings and, more generally, the importance of accounting information, must be placed by all analysts in the context of wider issues and objectives. Thus it is clear that the results announcement is simply an opportunity to generate brokerage commission income. More generally, it is a chance for analysts to reputation-build by demonstrating their knowledge of the company, understanding of the industry, and awareness of share price determinants. This reputation-building helps to establish 'lead analyst'

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[10] This revision of forecasts after, rather than before, the earnings announcement is consistent with Stickel (1989).

[11] This evidence accords with Lang and Lundholm (1996), who show that dispersion among individual analysts' forecasts is inversely related to company size.

[12] This finding is consistent with Dimson and Marsh (1984), who find that individual analysts do not have unique forecasting ability and, further, that the standard deviation of brokers' forecasted returns is smaller than that for actual outcomes (indicating collective conservatism, and correspondingly lower information usefulness).

[13] This finding is consistent with Francis and Philbrick (1993), who find that analysts (acting rationally) do not necessarily have an incentive to minimise earnings forecast errors.

[14] It may be noted that market efficiency does not require that all analysts are able to interpret all public information, but only that prices reflect this information. This is not inconsistent with there being only a single 'accounting expert' within any given market sector.

**Table 2**
**Aspects of the definition of discontinued activities within FRS3**

| | *Is the definition appropriate?* | *Is the definition inappropriate?* |
|---|---|---|
| Permanent or completed within 3 months of year end | 27 | 5 |
| Materially affects nature and focus of the business | 27 | 5 |
| Physically and operationally separable | 22 | 10 |
| Need not be a business segment (defined by SSAP 25) | 30 | 2 |

status, as reflected by client assessment in the annual Extel rankings. In turn, this enhanced ranking increases the analyst's propensity to generate income.

In summary, while the analysts undoubtedly attached great importance to earnings news, their working environment was such that earnings information was but one of many areas of attention and that, therefore, knowledge of accounting was not necessarily a highly valued skill. This observation clearly has important implications for analysts' detailed interpretation and use of earnings information, evaluated in Section 6.

## 6. FRS3 and the role of the ASB

One of the findings presented in Section 5 was that analysts use reported earnings after first making adjustments to them. The measure of earnings given by these adjustments, which may be termed 'normalised' earnings, was the subject of specific, directed interview research, reported in this section of the paper.

An initial finding from the interviews was that there was very little support for the possibility that the ASB should introduce its own version of normalised earnings. Some 20 analysts were opposed to this idea, seven were in favour, and the remaining five were indifferent. The opposition was grounded mainly on the belief that there were already sufficient definitions (such as IIMR, 1993), and that the ASB's own would add nothing to them. In practice, the analysts often use more than one definition of eps in their reports. There is rarely a systematic, mechanistic use of a single definition, and it is unlikely that any given measure would actually be ignored. Reports would normally contain the firm's in-house definition, although this is often not followed precisely, and any given analyst would have his or her own version of normalised earnings.[15]

With regard to the calculation of normalised earnings, it was outlined in Section 2.2 above that FRS3 focuses on three components of financial performance: first, the disclosure of operating profit for acquired, continuing and discontinued activities; second, the reporting of exceptional items; and, third, the reconciliation of earnings to changes in reserves. Each of these components was addressed directly in the interviews.

Regarding the first component, all but one of the analysts supported strongly the FRS3 requirement to differentiate the operating results of acquisitions from those of continuing operations. This is because the differentiation enables the assessment of the like-for-like performance of the existing business and the decomposition of earnings growth between that which is organic and that which is purchased. Opinion is divided, however, over the appropriateness of FRS3's requirement that the operating performance of acquisitions need only be shown in their first year. Some 17 of the 32 analysts were happy with this requirement. They conceded either that second year disclosure would be misleading or difficult (due to the integration of acquisitions), or else that it would be unhelpful anyway because the value of the information was in locating the step change in activity, which is achieved by first year disclosure. In contrast, the remaining 15 analysts believed that second year disclosure was both possible to achieve and useful in assessing the ongoing performance of the acquisition, with the implication that the ASB could usefully enhance value-relevant disclosure.

Two questions were asked regarding the disclosure of discontinued operations. The first was whether or not analysts believe that the level of disclosure is sufficient. The consensus was that it is, with only four of the 32 analysts dissenting. The second question probed more deeply into the basis of disclosure. Specifically, analysts were asked if they approved of individual aspects of the definition of discontinued operations within FRS3 (see Table 2). In most cases, the analysts were not actually familiar with this level of detail, such that the categories in Table 2 needed to be explained.

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[15] Note that, in practice, it is often the case that the differences between definitions do not lead to an actual difference in reported earnings—possibly when a company does not report any exceptional items, for example.

**Table 3**
**Inclusion of exceptional items in normalised earnings**

| | | *Do analysts include?* | *Do analysts exclude?* |
|---|---|---|---|
| Above operating profit: | Recurring | 32 | 0 |
| | Non-recurring | 8 | 24 |
| Below operating profit: | Reorganisation costs | 13 | 19 |
| | Profit/loss on asset sale | 4 | 28 |
| | Profit/loss on sale/termination of operation | 2 | 30 |

As the Table shows, however, there turned out to be strong support for the ASB's definition.

These results have two implications. The first is that the definition of discontinued activities within FRS3 is generally regarded as appropriate by analysts. The second, more general, implication is that the onus is on the ASB to ensure consistency between the *actual* content of financial reporting standards (such as FRS3) and analysts' *perceptions* of that content. Otherwise, the market may make inappropriate use of information. An example of this would arise if a company decided to discontinue one of its businesses. An analyst might assume that the business would be treated as discontinued, but the FRS3 criteria might not accept it as such, causing the analyst to be misled.[16] Moreover, and as shown by Rapaccioli and Schiff (1991), the analyst might be deliberately misled by the company if he or she fails to recognise discretion in the distinction between continuing and discontinued operations.

With regard to the second component of FRS3 outlined above, only two of the analysts in the sample were opposed to the effective abolition of extraordinary items. The majority view was that extraordinary items had been abused by companies and also that, in any case, the distinction between extraordinaries and exceptionals was somewhat artificial from an analytical perspective.[17]

The distinction between different categories of exceptional items was not, however, perceived to be similarly artificial. This is shown in Table 3, which reports analysts' views on the inclusion or exclusion of FRS3 exceptionals in normalised earnings.

The inclusion of items perceived to be recurring, and the exclusion of those perceived to be one-off, suggests that analysts are seeking an underlying earnings measure for continuing trading operations. This observation is made notwithstanding the responses for reorganisation costs, which are the only area in Table 3 where analysts expressed ambiguity. This mixed response was explored in a follow-up question in the interviews. It was found that if, on the one hand, reorganisation costs are perceived to be 'genuinely one-off', then they will be excluded from normalised earnings. If, on the other hand, a company reports reorganisation costs regularly, then they are more likely to be viewed as an ongoing cost and will therefore be included. This can be illustrated by the following quotes from three of the interviewees:

> 'I tend to include them (reorganisation costs). Nowadays they seem to happen so often... they're a fact of life.'
> 'I'm very wary... companies always have to keep changing, and so you get (reorganisation) costs that just keep coming.'
> 'It depends upon the company. I usually exclude them... because they're big and don't happen often.'

It is clearly important that the constitution and purpose of reorganisation costs (and of exceptional items generally) are understood by analysts. This is a matter of additional disclosure that highlights the extent to which costs are ongoing.[18] The encouraging evidence from the interviews was that 20 of the analysts believed that there was sufficient information disclosure regarding exceptional items, while only five believed that there was not, and the remaining seven occupied the middle ground. This disclosure will not always appear in the annual report and accounts itself, but it will almost always form a central part of presentations to analysts at results announcements and, where necessary, it will be a focus for personal communication between an analyst and a company.[19]

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[16] This observation is similar in spirit to Hussain (1997), who examines the implications for analysts' forecast accuracy of the definition of segmental operations.

[17] This view is, of course, consistent with semi-strong form market efficiency.

[18] This evidence accords with Francis and Hanna (1996), who show that price responses are conditioned on the characteristics of asset write-offs.

[19] See, for example, Holland (1998a).

As a qualification on this evidence concerning the disclosure and interpretation of exceptional items, the interviews generated two further findings. First, it was clear that the analysts very rarely made adjustments from reported earnings to normalised earnings for anything other than exceptional items (which is consistent with the evidence from participant observation in Section 5 above). Second, it was far from clear how exceptional items affect share prices if they are excluded from normalised earnings. Interview discussions suggested that, in cases such as 'big bath' provisions, they simply 'drop out' of the analysis.[20] This implies that there is scope for creative accounting, because it gives companies an incentive to declare one-off exceptional debits but to avoid classifying similar one-off credits as exceptional.[21] It also suggests a lack of concern amongst analysts for the value-relevance of changes in the balance sheet, other than those caused by normalised earnings (see below).

The findings presented so far concern operating profit and exceptional items. A further element of profit available to shareholders is taxation. The analysts were therefore asked how they interpret the tax charge in order to gain a better understanding of ongoing earnings. All but 12 of the 32 interviewees claimed to make specific adjustments to the tax charge. These adjustments are limited, though, and they will typically only be made for exceptionals and for large one-off distortions in the tax rate. This is consistent with the importance of exceptionals to normalised earnings which was outlined above. It also, however, reflects a perceived paucity of disclosure relating to the tax charge. This is reflected further in Table 4, which reports analysts' perceptions of the sufficiency of three specific areas of tax charge disclosure.

Table 4 suggests considerable dissatisfaction. On further questioning, however, few analysts expressed a wish for greater disclosure. For most, the complexity of the tax charge does not repay close scrutiny, and as long as the tax rate and trend seem reasonable, reliance on personal contact with the company (typically with the finance director) is the most sensible basis for forecasting. Disclosure therefore acts as a confirmation of personal contact rather than as a basis for analysis itself. In other words, the insufficiency of disclosure does not act as a practical constraint on analysts' forecasts, whereas the restriction of personal contact would.

The analysts were also asked which treatment they would prefer for deferred tax (ASB, 1995). The highest response (13) was 'no preference'. Partial provision was favoured by 11 analysts, primarily on the grounds that it was a more realistic basis for the extrapolation of earnings. The remaining eight analysts expressed the contrary view that full provision was more prudent. Not one of the 32 analysts expressed strongly-held views, however, and (in contrast to the discussion of exceptional items) the general level of understanding appeared to be low.

The third and final component of financial performance in FRS3 concerns full articulation. In this context, a large majority of 26 of the 32 interviewees agreed with the statement that: 'The profit and loss account should be designed to reflect trading performance only, whereas the statement of total recognised gains and losses should incorporate all long term gains and losses.' This viewpoint is consistent with the (already identified) emphasis on underlying (permanent) trading performance, and it is also broadly supportive of the ASB's position (ASB, 1999). This said, however, it was only by a very small margin (and without much conviction) that analysts claimed to actually find the statement of total recognised gains and losses useful. Information on exchange differences was considered to be of some use by 17 analysts, while 18 regarded asset revaluations similarly.

As a general statement, analysts' keen interest in normalised earnings seemed to be matched by a degree of indifference towards the balance sheet. When asked, for example, whether fixed asset values are (in themselves) useful information, not one of the analysts believed them to be very useful, while 15 considered them of some use, 15 viewed them as of hardly any use, and two had no use for them at all.[22]

This relative indifference towards the balance sheet is also manifested in an apparent lack of concern for the interaction between earnings and balance sheet values. This has already been seen with respect to the 'dropping out' of non-recurring exceptionals. There was also little interest or support for FRS3's requirement that historic cost earnings should be disclosed whenever materially different from reported earnings. Indeed, most analysts seemed to be unaware of this requirement. Furthermore, there was considerable hesitancy and little conviction on the subject of goodwill. The analysts were asked which treatment they

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[20] Evidence for the US in Elliott and Hanna (1996) is that earnings response coefficients are lower in the presence of large write-offs, suggesting that analysts' perceptions of earnings quality are reduced.

[21] Similar scope arises in the distinction between continuing and discontinued operations, arising because the latter are excluding from normalised earnings and because the distinction between the two can be ambiguous (Rapaccioli and Schiff, 1991).

[22] This is consistent with the experimental evidence of Emmanuel et al. (1989).

**Table 4**
**Tax charge disclosure**

| | *Is disclosure sufficient?* | *Is disclosure insufficient?* |
|---|---|---|
| Actual tax charge vs. standard/'normal' rate | 11 | 21 |
| Management estimates behind the tax charge | 12 | 20 |
| Segmental analysis | 8 | 24 |

would prefer for purchased goodwill.[23] Their expressed opinions were somewhat 'forced' and not strongly held. They were also mixed. Write-off reserves was preferred by 15 analysts, while capitalisation and review was favoured by four and capitalisation and amortisation by seven. The remaining six analysts were indifferent between the three options. The majority preference for write-off was based mostly upon its simplicity and accepted usage.

The interviewees were also asked (hypothetically) if they would exclude the amortisation of goodwill in their calculation of normalised earnings, to which 18 said they would and 14 said they would not. Arguably, this difference of opinion reflects that some analysts view goodwill amortisation as unrelated to trading performance, whilst others regard it as an appropriate charge to reflect the cost of an acquisition. An alternative interpretation is that there is no clear understanding of how to treat goodwill.

There was also mixed evidence on how goodwill should be treated in the calculation of return on capital employed. Of the 32 analysts, 15 claimed to add goodwill back to capital employed, while the other 17 took their totals directly from the accounts (thereby leaving it written off). There was little indication of any other adjustments that are made to capital employed in deriving the return.

An important general theme from the interviews was that there are two very different categories of earnings measure—historic and forecast—and that, while the purpose of FRS3, IIMR and other definitions is to report historic performance, it is the earnings forecast that is most relevant to valuations and to investment decision-making.[24] The analysts do not, for example, forecast discontinued activities or exceptional items, and the differences between earnings definitions with respect to these items are of little or no practical relevance to forecasts. More important is the identification of components of earnings which can be extrapolated from historic performance to forecasts. In this respect, segmental information is of particular importance, and the analysts were therefore asked about segmental disclosure. Specifically, they were asked whether they supported disclosure on a geographical and a line-of-business basis (as required by SSAP 25) or whether they would prefer instead for the external reporting of segmental information to be based upon the company's internal reporting structure.

There were 13 analysts who implicitly endorsed SSAP 25 and preferred not to allow companies to report directly from their own management information systems. There were a number of justifications for this position, which fall broadly under two headings. First, the analysts were concerned to ensure comparability between the reported segments of different companies. Second, there was a concern about allowing discretion in financial reporting, which could lead to either inadequate or distorted disclosure. These responses are consistent with what analysts might reasonably expect from a financial reporting standard. As was the case with the views expressed on discontinued operations in FRS3, however, the analysts were responding on the basis of these reasonable expectations alone, rather than with a grounded understanding of the actual content of SSAP 25. For example, SSAP 25 allows that: 'determination of an entity's classes of business must depend on the judgement of the directors' (ASC, 1990, para. 13); common costs should be reported in the way that 'the directors deem most appropriate' (ASC, 1990, para. 23); and 'the directors should re-define the segments when appropriate' (ASC, 1990, para. 39). In other words, there is a significant degree of company-specific discretion within SSAP 25 which, on the face of it, appears inconsistent with the 'reasonable expectations' of the 13 analysts above.

Viewed in this light, the responses of the other 19 analysts reflected a different expectation of SSAP 25, rather than a different view on its actual content. Six analysts expressed the view that reliable and value-relevant information was best pro-

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[23] Note that the interviews took place while FRS10 (ASB, 1997) was still at discussion paper stage.

[24] The role of the earnings forecast is especially important given the dominance of the price-earnings ratio as a valuation model (see Section 2.3). Of the 32 analysts interviewed, only seven claimed to make regular use of a discounted cash flow model to value companies, while six claimed occasional use and 19 had no use at all.

vided directly from the company's own reporting systems, rather than by mandated disclosure. The remaining 13 analysts favoured either disclosure of both of the categories of segmental information outlined above, or else had a preference for neither and just an overall wish that there should be more segmental information disclosed. Concerns were expressed that there should be greater ease of reconciliation between geographic and line-of-business disclosure (in the form of cross-tabulation), and also that there should be control over time-series information, to prevent the creative re-stating of comparatives, as well as other distortions arising from mergers, reorganisations, and the like.

In summary, while there was a general understanding that companies were required to report segmental performance, there was little knowledge of what was actually *required* to be reported. Analysts' responses therefore took the form of a statement of the type of disclosure they would favour, given both their expectation of the content of SSAP 25 and their perceptions about management discretion, information comparability, volume of disclosure, and so on. In other words, while all analysts responded by stating what changes they would like to segmental disclosure, they were each referring to the assumed content of SSAP 25 rather than to its actual content. This finding reinforces that there is an onus on the ASB to match analysts' expectations of financial reporting with the reality.

Overall, the findings of this section of the paper are mixed. On the one hand, there is clarity and consistency in analysts' derivation of normalised earnings. On the other hand, there is ambiguity, apparently poor understanding and a degree of indifference with respect to other areas of the financial statements. These conclusions are consistent with those of Section 5, because they imply a keen interest in news, but a relative disinterest in underlying issues of accounting.

## 7. Interpretation of findings

Section 2.1 of this paper noted that, although there is no functional relationship in theory between accounting earnings and share prices, earnings are nevertheless value-relevant if they can be used in the prediction of future dividend-paying capacity. Consistent with this, the ASB aims in FRS3 to highlight value-relevant components of financial performance which, through the intermediation of analysts, are expected to become impounded in share prices.

At first sight, at least, FRS3 appears to achieve its aim. This study has shown that analysts treat the announcement of earnings with immediacy and importance and, further, that they make use of the components of FRS3 in extracting a measure of normalised earnings. This is evidence consistent with the efficient markets hypothesis. It also supports, and is corroborated by, the market-based evidence that was reviewed in Section 2.2—namely that there is (some) information content in the earnings announcement, that market expectations are represented by analysts' forecasts, and that measures of permanent earnings enhance the explanatory power of earnings with respect to prices.

This study has also found, however, that analysts are only interested in earnings to the extent that they are a medium for income generation, either directly through commissions, or indirectly through reputation-building. This is shown by the contrast between, on the one hand, the urgent interest in earnings news and, on the other, the low subsequent interest in reported earnings and the absence of internal monitoring of forecast accuracy. This paper therefore contributes to the new (and growing) literature recognising that earnings forecast accuracy is not the only benchmark against which the role of analysts should be understood (see, for example, Francis and Philbrick, 1993; Hunton and McEwen, 1997; McNichols and O'Brien, 1997 and Barker, 1998), from which it follows that evidence of 'inefficient' forecasts need not be inconsistent with economic rationality on the part of analysts.

An important implication of analysts not being 'earnings-focused' is that financial statement analysis is not necessarily their core competence, with the effect that their interpretation of earnings information is rather superficial. It has been shown, for example, that earnings are adjusted for exceptional items only. More generally, while the format and meaning of disclosed information on earnings components appears to be understood, the same is not true of the underlying basis of recognition and measurement, or of the interactions between earnings and the balance sheet. This poor understanding has been demonstrated in this paper in the context of discontinued activities, exceptionals, taxation, goodwill, capital employed, fixed asset values and segmental information.

Overall, these findings concerning analysts' incentives and abilities with respect to accounting information suggest a clear implication for the ASB—namely, that it plays an important role in determining the information set on which the market relies. Analysts have been shown to make use of the earnings information that is presented to them, but they have also been shown to have a limited appreciation of the factors affecting the valuation-relevance of this information. The ASB's reporting standards can therefore influence and guide analysts in the information sets that they employ, leading to *real* effects on stock market valuations.

## Appendix

### Complete list of questions asked at a results announcement meeting.[25]

1. Is the 9% increase in volume evidence of stock building (perhaps in anticipation of price increases) or is it genuine and sustainable? Does the increase in prices, Q1 to Q2, indicate a build-up of momentum?
2. Do you have a breakdown of volume, price, exchange and mix data for each major business group?
3. Has the plant for products X, Y and Z in locations A, B and C got formal approval to proceed?
4. Please can you explain the profits trend in associates, Q1 to Q2?
5. Please can you expand on the ACT position, and are you considering paying FIDs?
6. There has been a rebound in profits in W Division. To what extent is this seasonal and to what extent a real turnaround? Which of the ongoing businesses is markedly seasonal?
7. Will the current business portfolio be able to cope with the downturn when it comes? What is the future of location D?
8. Given your comments on debt restructuring, what is the debt structure now (including currencies)? What is the geographical split of the V business? In terms of competition in the market, what is your view of the government aid to W (a competitor)?
9. What is the balance in the current cash outflow between seasonal factors and working capital growth?
10. Is location E fully valued in the accounts or is it written off, and what is its future in the light of the cost reduction programme?
11. Are you under-geared as the recovery is picking up, and have 'cheap' acquisitions been missed?
12. A higher rate of capital expenditure is needed to expand the business—what will the rate rise to at the peak of the cycle? Substantial price increases have been seen recently. Are we approaching a marked slowdown?
13. How much longer will current rationalisation charges last? What is your thinking on acquisitions?

## References

ASB (1992). *FRS3 (Reporting Financial Performance)*. London: ASB.

ASB (1995). *Accounting for tax*. London: ASB.

ASB (1999). *Statement of Principles for Financial Reporting*. London: ASB.

ASB (1997). *FRS10 (Goodwill and Intangible Assets)*. London: ASB.

ASC (1990). *SSAP 25 (Segmental Reporting)*. London: ASC.

Abarbanell, J. S. (1991). 'Do analysts' earnings forecasts incorporate information in prior stock price changes?' *Journal of Accounting and Economics*, 14: 147–165.

Abarbanell, J. S. and Bushee, B. J. (1997). 'Fundamental analysis, forecast earnings, and stock prices'. *Journal of Accounting Research*, 35 (1): 1–24.

Arnold, J. A. and Moizer, P. (1984). 'A survey of the methods used by UK investment analysts to appraise investments in ordinary shares'. *Accounting and Business Research*, 14 (Summer): 195–207.

Barker, R. G. (1998). 'The market for information—evidence from finance directors, analysts and fund managers'. *Accounting and Business Research*, 29 (1): 3–20.

Barker, R. G. (1999). 'The role of dividends in valuation models used by analysts and fund managers'. *European Accounting Review*, 8 (2): 195–218.

Beaver, W. H. and Demski, J. (1979). 'The nature of income measurement'. *Accounting Review*, January: 38–46.

Beaver, W. H. (1998). *Financial Reporting: An Accounting Revolution*, 3rd ed. New Jersey: Prentice-Hall.

Bhaskar, K. N. and Morris, R. C. (1984). 'The accuracy of brokers' profit forecasts in the UK'. *Accounting and Business Research*, 14 (Spring): 113–24.

Bhushan, R. (1989). 'Firm characteristics and analyst following'. *Journal of Accounting and Economics*, 11: 255–74.

Bouwman, M. J., Frishkoff, P. A. and Friskkoff, P. (1987). 'How do financial analysts make screening decisions? A process model of the investment screening decision'. *Accounting, Organisation and Society*, 12 (1): 1–29.

Bouwman, M. J., Frishkoff, P. A. and Friskkoff, P. (1995). 'The relevance of GAAP-based information: a case study exploring some uses and limitations'. *Accounting Horizons*, 9 (4): 22–47.

Breton, G. and Taffler, R. J. (1995). 'Creative accounting and investment analyst response'. *Accounting and Business Research*, 25: 81–92.

Brown, L. D., Griffin, P. A., Hagerman, R. L. and Zmijewski, M. E. (1987a). 'Security analyst superiority relative to univariate time-series models in forecasting quarterly earnings'. *Journal of Accounting and Economics*, 9: 61–87.

Brown, L. D., Griffin, P. A., Hagerman, R. L. and Zmijewski, M. E. (1987b). 'An evaluation of the alternative proxies for the market's assessment of unexpected earnings'. *Journal of Accounting and Economics*, 9: 159–93.

Capstaff, J., Paudyal, K. and Rees, W. (1995). 'The accuracy and rationality of earnings forecasts by UK analysts'. *Journal of Business, Finance and Accounting*, 22 (1): 67–85.

Clarkson, G. P. E. (1962). *Portfolio Investment: A Simulation of Trust Investment*. New Jersey: Prentice-Hall.

Collins, D. and Kothari, S. P. (1989). 'An analysis of intertemporal and cross-sectional determinants of earnings response coefficients'. *Journal of Accounting and Economics*, 11: 143–81.

Day, J. (1986). 'The use of annual reports by UK investment analysts'. *Accounting and Business Research*, Summer: 295–307.

de Bondt, W. F. M. and Thaler, R. H. (1990). 'Do security analysts overreact?' *American Economic Review*, May: 52–7.

Dimson, E. and Marsh, P. (1984). 'An analysis of brokers' and analysts' unpublished forecasts of UK stock returns'. *Journal of Finance*, December: 1,257–1,292.

Easton, P. D. and Harris, T. S. (1991). 'Earnings as an explanatory variable for returns'. *Journal of Accounting Research*, Spring: 19–36.

Easton, P. D. and Zmijewski, M. E. (1989). 'Cross-sectional variation in the stock market response to accounting earnings announcement'. *Journal of Accounting and Economics*, 11: 117–41.

Elgers, P. and Murray, D. (1992). 'The relative and complementary performance of analysts and security-price based

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[25] Actual business names and locations have been replaced in the text by capital letters.

measures of expected earnings'. *Journal of Accounting and Economics*, 15: 303–16.

Elliott, J. A. and Hanna, J. D. (1996). 'Repeated accounting write-offs and the information content of earnings'. *Journal of Accounting Research*, 34 (Supplement): 135–55.

Emmanuel, C. R., Garrod, N. W. and Frost, C. (1989). 'An experimental test of analysts' forecasting behaviour'. *British Accounting Review*, 21: 119–26.

Extel (1994). *Ranking of Investment Analysts*. London: Extel Financial Ltd.

Fairfield, P. M., Sweeny, R. J. and Yohn, T. L. (1996). 'Accounting classification and the predictive content of earnings'. *The Accounting Review*, 17 (3): 337–55.

Fama, E. (1970). 'Efficient capital markets: a review of theory and empirical work'. *Journal of Finance*, 25: 383–423.

Francis, J. and Philbrick, D. (1993). 'Analysts' decisions as products of a multi-task environment'. *Journal of Accounting Research*, 31 (2): 216–31.

Francis, J. and Hanna, J. D. (1996). 'Causes and effects of discretionary asset write-offs'. *Journal of Accounting Research*, 34 (Supplement): 117–34.

Fried, D. and Givoly, D. (1982). 'Financial analysts' forecasts of earnings: a better surrogate for market expectations'. *Journal of Accounting and Economics*, 4: 85–107.

Gniewosz, G. (1990). 'The share investment decision process and information use: an exploratory case study'. *Accounting and Business Research*, 20 (Summer): 223–30.

Govindarajan, V. (1980). 'The objectives of financial statements: an empirical study of the use of cash flow and earnings by security analysts'. *Accounting, Organisations and Society*, 5: 383–92.

Hew, D., Skerratt, L., Strong, N. and Walker, M. (1996). 'Post-earnings-announcement drift: some evidence for the UK'. *Accounting and Business Research*, 26 (4): 283–93.

Hicks, J. (1946). *Value and Capital*. Oxford: Clarendon Press.

Holland, J. (1998a). 'Private disclosure and financial reporting'. *Accounting and Business Research*, 28 (4): 255–69.

Holland, J. (1998b). 'Private voluntary disclosure, financial intermediation and market efficiency'. *Journal of Business, Finance and Accounting*, 25 (1) & (2): 29–68.

Horton, J., Tonks, I. and Acker, D. (1998). 'The impact of FRS3 on analysts' ability to forecast EPS'. Working paper: LSE and University of Bristol.

Hunton, J. E. and McEwen, R. A. (1997). 'An assessment of the relation between analysts' earnings forecast accuracy, motivational incentives and cognitive information search strategy'. *Accounting Review*, 72 (4): 497–515.

Hussain, S. (1997). 'The impact of segment definition on the accuracy of analysts' earnings forecasts'. *Accounting and Business Research*, 27 (2): 145–56.

IIMR (1993). *The Definition of IIMR Headline Earnings* (Statement of Investment Practice No. 1). Bromley, Kent: IIMR.

Jorgensen, D. L. (1989). *Participant Observation*. Newbury Park, CA: Sage.

Kormendi, R. and Lipe, R. (1987). 'Earnings innovations, earnings persistence, and stock returns'. *Journal of Business*, 60 (3): 323–45.

Lang, M. H. and Lundholm, R. J. (1996). 'Corporate disclosure policy and analyst behaviour'. *The Accounting Review*, 71 (4): 467–92.

Lee, T. and Tweedie, D. P. (1981). *The Institutional Investor and Financial Information*. London: ICAEW.

Lev, B. (1989). 'On the usefulness of earnings and earnings research: lessons and directions from two decades of empirical research'. *Journal of Accounting Research*, 27 (Supplement): 153–201.

Lys, T. and Sohn, S. (1990). 'The association between revisions of financial analysts' earnings forecasts and security-price change'. *Journal of Accounting and Economics*, 13: 341–63.

McNichols, M. and O'Brien, P. C. (1997). 'Self selection and analyst coverage'. *Journal of Accounting Research*, 35 (Supplement): 167–99.

Mintzberg, H. (1973). *The Nature of Managerial Work*. New Jersey: Harper and Row.

O'Brien, P. C. (1988). 'Analysts' forecasts as earnings expectations'. *Journal of Accounting and Economics*, 10: 53–88.

O'Hanlon, J. A., Poon, S. and Yaansah, R. A. (1992). 'Market recognition of differences in earnings persistence: UK evidence'. *Journal of Business, Finance and Accounting*, 19 (4): 625–39.

O'Hanlon, J. A. and Pope, P. (1997). 'Does dirty surplus accounting conceal the facts?' Working paper presented at the BAA National Conference.

Ohlson, J. A. (1991). 'Earnings, book values and dividends in security valuation'. Working paper: Columbia University.

Ou, J. A. and Penman, S. H. (1989). 'Financial statement analysis and the prediction of stock returns'. *Journal of Accounting and Economics*, 11: 295–329.

Parkash, M. (1995). 'The differential information contents of unexpected permanent and temporary earnings'. *Journal of Business, Finance and Accounting*, 22: 625–712.

Parker, R. H., Harcourt, G. C. and Whittington, G. (1986). *Readings in the Concept and Measurement of Income*, 2nd ed. Oxford: Philip Allan.

Peasnell, K. (1982). 'Some formal connections between economic values and yields and accounting numbers'. *Journal of Business, Finance and Accounting*, Autumn: 361–81.

Pike, R., Meerjanssen, J. and Chadwick, L. (1993). 'The appraisal of ordinary shares by investment analysts in the UK and Germany'. *Accounting and Business Research*, 23 (Autumn): 489–99.

Rapaccioli, D. and Schiff, A. (1991). 'Reporting sales of segments under APB Opinion No. 30'. *Accounting Horizons*, December: 53–9.

Previtts, G. J., Bricker, R. J., Robinson, T. R. and Young, S. J. (1994). 'A content analysis of sell-side financial analysts company reports'. *Accounting Horizons*, 8: 55–70.

Schipper, K. (1991). 'Analysts' forecasts'. *Accounting Horizons*, 5 (December): 105–21.

Stickel, S. E. (1989). 'The timing and incentives for annual forecasts near interim earnings announcements'. *Journal of Accounting and Economics*, 11: 275–92.

Strong, N. (1993). 'The relation between returns and earnings: evidence for the UK'. *Accounting and Business Research*, Winter: 69–77.

Strong, N. and Walker, M. (1993). 'The explanatory power of earnings for stock returns'. *Accounting Review*, April: 385–99.

White, G. I., Sondhi, A. C. and Fried, D. (1997). *The Analysis and Use of Financial Statements*, 2nd ed. Chichester, NY: Wiley.

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# Simultaneous determination of UK analyst following and institutional ownership

**Simon Hussain***

**Abstract**—This study examines analyst following for firms in the UK Top 350 as of January 1998, within a simultaneous equation framework. A major conclusion to be drawn from this investigation is that, contrary to prior UK evidence, analyst following and institutional ownership are positively associated. This relationship is identified once the endogenous nature of variable determination is acknowledged. This study also finds that analyst following is positively associated with firm size. This results from the greater economic incentives and potential rewards for analysts following firms with large market values. Analyst following is negatively associated with total risk, possibly indicating a concern for forecasting reputation. There is also evidence of an industry-sector effect. Where firms operate in sectors which have greater regulation of activities, demand for analysts' services is reduced. Thus, regulation may act as a substitute source of information for investors. The influence of insider ownership on analyst following appears to operate through its impact on institutional ownership. Contrary to the pre-experimental expectation, neither analyst following nor institutional ownership are significantly associated with trading activity. These conclusions appear robust to a number of sensitivity tests.

## 1. Introduction

### *1.1. Analyst following: a note*

Much of the early research on financial analysts concentrated on their predictive ability, with the main focus being on corporate earnings numbers (e.g. Basi, Carey and Twark, 1976; Brown and Rozeff, 1978; Bhaskar and Morris, 1984). However, more recently there has been a move toward investigating factors influencing the behaviour of financial analysts in an attempt to gain a more detailed insight into those forces which may impact on analysts' forecasts and on market prices.[1] One of the major behavioural factors to be studied in the past decade has been analyst following. This is an important issue to those concerned with the working of capital markets and the pricing of securities because of its potential implications for market efficiency (Foster, 1986: 301–302).

The impact of analyst following on efficiency is often cited as an explanation for firm size effects in relation to the impounding of information into prices. Studies like Freeman (1987) find that for large firms, information regarding future earnings numbers is incorporated into prices at a much greater horizon than for smaller firms. A similar pattern can be observed in the superiority of analysts' earnings forecasts relative to time-series models (Brown, Richardson and Schwager, 1987). Since analyst following tends to be greater for larger firms, these findings fit with our expectation regarding the impounding of information into prices and earnings forecasts. The increased number of analysts leads to increased competition in data collection and processing, and more rapid impounding of information into forecasts and prices.

Prior research on analyst following has tended to be empirical in nature. US studies by Bhushan (1989), Moyer, Chatfield and Sisneros (1989) and Brennan and Hughes (1991) have examined analyst following in single equation settings, utilising OLS regression modelling. O'Brien and Bhushan (1990) and Chung and Jo (1996) have developed this analysis by investigating analyst following within a simultaneous equation framework. Evidence on UK analyst following is presented in Marston (1997). The study examines the determinants of analyst following for 251 firms from the UK Top 500 using a single equation OLS regression approach.

Of course, within any individual brokerage house it is likely that the allocation of analysts to particular sectors will be heavily influenced by

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[1] For example, McNichols and O'Brien (1997) investigate the link between analysts' information about stocks and their decision to issue recommendations. Mikhail, Walther and Willis (1997) examine whether analyst performance improves with experience.

idiosyncratic factors like existing expertise within the brokerage house; special links which brokers may have with individual companies and managements; and historical or organisational factors. However, when modelling the whole market for analysts' services it is unlikely that these factors will have a systematic impact at the macro level because idiosyncratic factors, by their very nature, will tend to 'wash-out'. The main systematic factors influencing how analysts are allocated to firms or sectors are likely to be those firm characteristics which influence economic rewards or costs.

### *1.2. Analyst following and firm characteristics: a general model*

Traditional economic analysis provides one means by which we may model the link between analyst following and firm characteristics. Bhushan (1989) presents a model of investors' total expenditure on analysts' services for which analyst following acts as a proxy measure. To begin, the aggregate demand for, and supply of, analysts' services are assumed to be functions of the per-unit price of analysts' services (P) and a number of firm characteristics ($k_1, k_2, \ldots k_n$):

$$Q_D = D(P, k_1, k_2, \ldots k_n) \qquad (1)$$

$$Q_S = S(P, k_1, k_2, \ldots k_n) \qquad (2)$$

where the demand and supply functions exhibit the normal relationship with price (i.e. $\partial Q_D/\partial P < 0$ and $\partial Q_S/\partial P > 0$). The equilibrium quantity of analysts' services for this model is denoted $Q^*$. At this point, investor's equilibrium total expenditure on analysts' services for a specific firm (with a given set of characteristics) is simply the product of price and quantity:

$$EXP^*(k_1, k_2, \ldots k_n) = [P^*(k_1, k_2, \ldots k_n)]\cdot[Q^*(k_1, k_2, \ldots k_n)] \qquad (3)$$

The next stage is to determine how changes in firm characteristic *i* impact on total expenditure. This may be assessed by calculating $\partial EXP^*/\partial k_i$:

$$\partial EXP^*/\partial k_i = \frac{Q^*[(1+\varepsilon_s)(\partial Q_D/\partial k_i) - (1+\varepsilon_D)(\partial Q_s/\partial k_i)]}{(\partial Q_s/\partial P - \partial Q_D/\partial P)} \qquad (4)$$

The normal relationship between price and the supply and demand functions implies that the denominator of the right-hand side of equation 4 will be positive, and that the own price elasticity of supply of analysts' services ($\varepsilon_S$) will be positive. This means that $\partial EXP^*/\partial k_i$ will be positively related to the impact of characteristic *i* on demand (i.e. $\partial Q_D/\partial k_i$). The own price elasticity of demand for analysts' services ($\varepsilon_D$) will be negative but, as can be seen from equation 4, it is important to know whether or not it will be elastic (i.e. $\varepsilon_D < -1$). Bhushan suggests that this relationship is likely to be elastic (Bhushan, 1989: 259). A result of $\varepsilon_D$ being elastic is that $\partial EXP^*/\partial k_i$ will be positively related to $\partial Q_S/\partial k_i$.

Of course, this analysis provides only a very general framework for understanding *how* a set of firm characteristics ($k_1, k_2, \ldots k_n$) may impact upon analyst following through their influence on the demand and supply functions for analysts' services. This analysis does not tell us *which* firm characteristics will be important. As a result, studies of analyst following have employed a wide range of different explanatory variables. In addition, the analysis is somewhat complicated by the realisation that not all of the variables included in the set of firm characteristics are exogenously determined. There are reasons to suspect that one of the major firm characteristics employed by Bhushan (1989), namely institutional ownership of equity, is determined endogenously with analyst following.

### *1.3. Analyst following and institutional ownership*

One of the major elements to be considered when examining analyst following is the institutional ownership of equity. A survey of major UK firms conducted by Marston (1996) concludes that many firms actively seek to encourage analyst following through invitations to meetings (Marston, 1996:29), and thereby increase institutional ownership.

The link between analyst following and institutional ownership is, however, likely to be one of simultaneous determination. Since institutional investors are major clients of financial analysts, it may be expected that the demand for, and supply of, analysts' services will be greater for those firms which are favoured by institutional investors. Similarly, it may also be expected that institutions will prefer firms which are already followed by many analysts, because of the greater amount of information and expertise available to the institutional investor. This scenario suggests a positive endogenous relationship between analyst following and institutional ownership.

Another reason for an association between analyst following and institutional ownership of equity is the risk of legal action by disgruntled investors. Since institutional stockholders claim to act in the best interests of their clients, obtaining the services of analysts provides tangible evidence of this fiduciary role:

> 'Fiduciaries have cited use of analyst reports as evidence of care and prudence. Institutions' willingness to pay for research gives

> analysts a motive for following firms.' (O'Brien and Bhushan, 1990: 56).

Of course, this also suggests that institutions will be attracted more to those firms for which there is already a well established following of financial analysts.

In contrast to the theoretical rationale above, and empirical evidence from the US (e.g. Bhushan, 1989; Moyer, Chatfield and Sisneros, 1989), an OLS regression-based study by Marston (1997) finds a significant *negative* association between analyst following and institutional ownership for major UK firms. There are several possible explanations for this unusual result.

One possible explanation is that there are differences between the UK and US regarding the relationship between analyst following and institutional ownership. Indeed, Bhushan (1989: 260) notes that the *a priori* relationship between these two variables is ambiguous. The degree to which a firm is institutionally owned will influence both the supply and demand for analysts' services. If institutional owners carry out their own in-house analysis, then the demand for external analysts' services will be reduced as the concentration of institutional ownership increases. In addition, since brokerage house analysts play an important role in generating transactions in the securities marketplace, the impact of institutional ownership may also depend on whether the majority of transactions business is from small investors or institutions. If most transactions business is provided by institutions, analyst supply may be expected to increase as institutional ownership increases. If most transactions business is provided by small investors, then greater institutional ownership is expected to be associated with reduced analyst supply. Thus, structural differences between US and UK securities markets may explain the negative relationship observed by Marston (1997).

A second possible explanation for the negative association between analyst following and institutional ownership documented in Marston's study is the way in which analyst following is measured. The most commonly used measure of analyst following is the number of analysts contributing current-year forecasts to the Institutional Brokers Estate System (I/B/E/S) database. Studies by Moyer, Chatfield and Sisneros (1989), O'Brien and Bhushan (1990), Brennan and Hughes (1991) and Chung and Jo (1996) utilise this measure of analyst following. Marston (1997) uses an alternative measure of analyst following, namely the number of sell side analysts invited by companies to investor-relations meetings as revealed through questionnaires sent to UK Top-500 companies. This measure will not necessarily correspond with the number of analysts actively researching a company's stock, since many firms invite analysts to meetings in an attempt to attract their interest and gain a higher profile within the City. Indeed, it is quite possible that the largest numbers of invitations may be sent by those firms which currently have few analysts following them but wish to increase their following. This could lead to Marston's measure of analyst following being weakly (or even negatively) associated with the true number of analysts researching a firm.

A third possible explanation for the negative association between UK analyst following and institutional ownership reported by Marston (1997) is that the results of the OLS regression are severely affected by simultaneous equation bias. In some cases this problem can lead to 'sign switching'. An example of this problem is given in Griffiths, Hill and Judge (1993: 619), where the OLS slope estimate in a demand function is incorrectly estimated to be positive. It is possible that a problem similar to this may affect the OLS estimates reported by Marston (1997) if analyst following and institutional ownership are determined within a simultaneous equation system.

In this study it will be assumed that the relationship between analyst following and institutional ownership is of the general form:

$$\textit{Analyst Following} = a_0 + a_1\,(\textit{Institutional Ownership}) + \sum_{i=2}^{I} a_i X_i + \varepsilon \qquad (5)$$

$$\textit{Institutional Ownership} = g_0 + g_1\,(\textit{Analyst Following}) + \sum_{i=2}^{I} g_i X_i + \upsilon \qquad (6)$$

where $X_i$ is *i*th exogenous variable (where $i = 2, ....I$), $a_i$ and $g_i$ are model parameters, and $\varepsilon$ and $v$ are random error terms. If the endogenous nature of analyst following and institutional ownership is ignored, application of OLS regression estimation to either of the above equations will result in biased and inconsistent parameter estimates. This is because the endogenous variables being used as regressors will be correlated with the error terms, violating an important OLS assumption.

It is the aim of this study to examine the determinants of UK analyst following in a manner which builds on Marston's (1997) study. Firstly, an alternative measure of analyst following will be utilised, namely the number of analysts contributing to the I/B/E/S database. Secondly, analyst following will be empirically examined using an estimation procedure appropriate to simultaneous equation systems. Three stage least squares (3SLS) estimation is used here. This generates parameter estimates for equations estimated as a whole system and so utilises more information than some alternative estimators for simultaneous equation systems (e.g., two stage least squares).[2]

## 2. Variable measurement and selection criteria

The following section describes the measurement of the endogenous and exogenous variables to be used here. Different studies of analyst following have used a wide range of explanatory variables, often with relatively weak justification. In this study an attempt has been made to concentrate only on those variables for which there appears to be a sound justification either in terms of economic incentives or in terms of analyst reputation. This section also details the sample selection criteria for the empirical analysis.

### *2.1. The endogenous variables*

The main analyses will be conducted on the assumption that there are two endogenous variables within this system, namely analyst following and institutional ownership.

- *Analyst following*

Analyst following is difficult to measure with precision. The most common measure, the number of analysts contributing to the I/B/E/S database, is unlikely to represent the universe of active analysts. In addition, this is unlikely to be a perfect measure of the resources devoted to the researching of companies because it is well known that some analysts are more thinly-spread than others. Some brokerage houses will employ only one or two analysts to look after the universe of small firms, for example. While acknowledging potential limitations to the I/B/E/S data, alternative sources of such information are not readily available to researchers and are unlikely to be superior to the I/B/E/S data. Two I/B/E/S measures of analyst following are employed here, taken from the *I/B/E/S Summary Data (International)* file for January 1998. Firstly, the number of analysts contributing earnings forecasts for the current fiscal year (AF1) and the number contributing forecasts for the next fiscal year (AF2). It is possible that analysts who are spread thinly across many firms, or who are not strongly committed to a particular industry sector, may not generate forecasts beyond the current fiscal year because their lack of knowledge or research resources will be revealed. Thus, these analysts may drop out of the AF2 measure.

- *Institutional ownership*

Like analyst following, the measurement of institutional ownership is not without its problems. Institutions holding 3% or more of equity are disclosed in annual reports. This information is collected from the Hemmington-Scott *Equities Direct* website at the end of April 1998.[3] Since each major institutional shareholder is identified individually it is possible to derive two measures of institutional ownership—the total percentage of equity held by major institutional shareholders (INST%) and the number of major institutional shareholders (NINST). Two potential problems arise in relation to these data, which also apply to previous studies which employ institutional ownership measures.

Firstly, only institutional shareholdings of three percent or more are disclosed. Secondly, the information on shareholdings relates to each firm's most recent end-of-year, which varies for the sample of companies used here. The first issue is likely to be a problem in cases where institutions invest an identical monetary amount in each firm; such investments are more likely to pass the three percent-threshold for smaller firms than for larger firms. However, if institutions create value-weighted portfolios, consisting of $x\%$ of each firm's equity, then their holdings will be disclosed in all cases or none at all depending on whether $x$ exceeds three. The second issue is, in practical terms, unlikely to be a major problem. Although analyst following is likely to react to economic factors over a period of several years, it takes time to train analysts, so analyst following is not likely to change over several months. The fact that some of the data reported will be for year-ends which occur during different months is unlikely to be a major problem from an empirical perspective.

### *2.2. The exogenous variable*

There are a number of exogenous variables within the equation system estimated here. These variables are described below, together with remarks about their likely association with analyst following and institutional ownership.

- *Market value of equity (firm size)*

Information which identifies mis-priced securities is potentially more valuable to an investor when it relates to larger firms. Trading on this information is less likely to be immediately noticed by other investors, thus providing a greater window for profitable trading before the information eventually becomes impounded in prices. In addition, large firms offer greater opportunities for large scale buying and selling, so increasing the magnitude of profits from trading on information. These arguments are repeated in a wide range of studies which have investigated firm size effects in securities markets (e.g., Freeman, 1987). Market value is included as an explanatory variable in almost all studies of analyst following, usually as a log-transformation. Analyst following is expected to be positively associated with market value.

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[2] The application of 2SLS estimation is referred to in Section 4 of this paper.

[3] This time-lag in relation to the I/B/E/S data was to ensure that data from the relevant annual reports had been included on the Hemmington-Scott website.

The relationship between firm size and institutional ownership is more difficult to assess *a priori.* The degree to which firms are held by institutions may depend on the degree to which institutions wish to include smaller firms in their portfolios. Small firms have been a popular focus for portfolio managers during the past two decades. Also, it is possible that the very largest firms will have a large number of small private shareholders who consider these investments to be 'a safe bet'. This could limit the scope for institutional ownership amongst the very largest firms. Of course, since all firms in this study are members of either the FTSE 100 or the Mid 250 indices it is debatable whether any can be truly classified as small firms.

The market value data are taken from the London Business School publication *Risk Measurement Service* for the quarter ending December 1997.

- *Industry membership*

A number of studies (Bhushan, 1989; Moyer, Chatfield and Sisneros, 1989; O'Brien and Bhushan, 1990; Marston, 1997) include dummy variables for a variety of individual industry sectors. The results are mixed and it is not obvious that there should be a significant industry-effect for analyst following. However, there is an argument for examining those sectors which may be more heavily affected by regulatory bodies or legal regulation and constraints. It is possible that the regulatory bodies which oversee these sectors reduce investors' demand for external financial analysis by providing a substitute source of monitoring (Moyer et al., 1989: 506).

For convenience, the impact of regulation is examined here by using a single dummy variable (REG) for utilities, including telecommunications, and financial companies. Investors can gain an insight into utilities' pricing structures through the public pronouncements of 'watchdogs'. Financial institutions must operate within strict guidelines in relation to banking and investments. This may reduce the demand for financial analysts' services from investors. Conversely, institutional ownership may be expected to be greater for regulated firms if non-expert investors and portfolio managers can gain additional insight from 'watchdogs' or known regulations affecting firms' activities.

Of course, it may be that some firms outside of these sectors also face regulation, and that some firms within these sectors are less regulated than others. However, the approach used here should be sufficient to detect any significant impact which regulation may have on analyst following. Industry sector classifications for firms are obtained from the Hemmington-Scott *Equities Direct* website.

- *Total risk and systematic risk*

Two measures of risk are used in this study: total risk or returns variability (VAR) measured by the standard deviation of stock returns, and systematic risk (BETA) estimated as the regression slope of equation 7:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \zeta_{i,t} \qquad (7)$$

where for period t, $R_{i,t}$ = the return on asset *i*; $R_{m,t}$ = the return on the market; $\zeta_{i,t}$ = a random error term following the usual OLS assumptions of a zero mean and a constant variance. Both VAR and BETA are obtained from the LBS *Risk Measurement Service* for the quarter ending December 1997.

*A priori*, it is difficult to identify the direction of the relationship between risk and analyst following. If data collection and specialist knowledge allow analysts to more accurately forecast future earnings and prices, there is greater scope for profitable trading for firms with a high variability of returns; this could lead to increased analyst following. However, potential losses are also greater for volatile stocks. In addition, since analysts' reputations are based, in part, on their predictive ability in relation to prices and earnings numbers, there may be a reluctance to follow highly volatile firms because of the increased likelihood of extreme forecast errors. Studies by Bhushan (1989), Brennan and Hughes (1991), Chung and Ho (1996) and Marston (1997) document a significant positive association between analyst following and variability of returns, while O'Brien and Bhushan (1990: 70) find that analyst following is weakly negatively associated with variability of returns. This is an interesting point to note because, unlike the other studies, O'Brien and Bhushan examine analyst following and institutional ownership within a simultaneous equation framework similar to that employed here.

Systematic risk is not normally included as an explanatory variable for analyst following. There is some justification for this from surveys of UK analysts' practices. Studies by Arnold and Moizer (1984) and Pike, Meerjanssen and Chadwick (1993) find that beta-analysis is not widely used by UK analysts. However, beta is included here as an explanatory variable relevant to the determination of institutional holdings. The rationale for the inclusion of beta is that institutional holders are usually portfolio holders and should therefore be concerned with the systematic risk of individual securities, rather than their total risk. Analysts, who generate recommendations and forecasts for individual securities, are more likely to be sensitive to total risk. The relationship between beta and institutional ownership will depend on the risk profiles of portfolios managed by UK institutional investors.

- *Market model $R^2$*

The market model $R^2$ (RSQ) measures the degree to which variation in stock returns is explained by equation 7. The $R^2$ value may be considered a measure of risk or uncertainty regarding the future price of a stock; even if analysts can predict future market movements, they will still have little insight into the future price movements for firms with low market model $R^2$ values. Thus, it may be expected that analysts would prefer firms with high $R^2$ values because of the potentially damaging effect which extreme price-forecasting errors (associated with low $R^2$ firms) may have on their reputation.

There is also an issue relating to information costs which may cause analysts to favour firms with high $R^2$ values:

> 'For a given level of information costs relating to macro variables, the marginal information acquisition cost for a firm will be low if the ... [$R^2$] ... between the returns on the firm and the market is high. Hence, ceteris paribus, information acquisition cost is likely to be an inverse function of the $R^2$.' (Bhushan, 1989: 263)

Both Bhushan (1989) and Marston (1997) find a positive association between analyst following and $R^2$, although the association is stronger in Bhushan's US study than in Marston's UK study. The relationship between RSQ and institutional ownership is likely to depend on the risk profiles desired by institutional portfolio managers. For this study, the market model $R^2$ is obtained from the LBS *Risk Measurement Service* for the quarter ending December 1997.

- *Insider ownership*

Insider ownership (INSIDE) is measured here as the percentage of shares held by named individuals, as reported on the Hemmington-Scott *Equities Direct* website. Shareholdings are disclosed for holdings in excess of one percent of the market value of equity. It is likely that institutional ownership is negatively related to insider ownership. Where a large proportion of a firm's equity is held by insiders, especially if they are family members, institutions may find it more difficult to have an influence on corporate policy. This may be a particular problem where family members believe that the firm should pursue what may be termed *social* objectives[4] rather than single-mindedly pursuing shareholders' interests. Where family and insider ownership is very small it is more likely that institutional shareholders will be able to exert influence over corporate policy.

There are reasons to suspect that analyst following will be negatively associated with insider holdings. Bhushan (1989: 260–61) suggests that demand for analysts' services is more likely to derive from outsiders rather than insiders. Also, if insider ownership is associated with greater secrecy within a firm, the costs of data collection may increase. There may also be an agency rationale, to the extent that analyst monitoring can reduce the agency costs arising from the separation of ownership and control (Moyer et al., 1989: 504).

- *Trading activity*

Many analysts are employed by brokerage houses which derive much of their income from activities relating to stock trading. It may be expected that analyst following will be greater for firms whose stocks are heavily traded because the brokerage houses in which the analysts are employed have a financial incentive to concentrate research on heavily traded stocks, or because analysts have personal financial incentives to concentrate on firms whose stocks are traded frequently and in large volume. The main measure of trading activity used here is the annualised trading value of equity (VALUE), based on the trading velocity (VEL) measure obtained from the LBS *Risk Measurement Service* for the quarter ending December 1997. VEL is the value of shares traded, on an annualised basis, as a percentage of market value. Since the equivalent values for the end-of-quarter stock price (PRICE) and market value of equity (MV) are also given in the same publication, measures of annualised volume (VOL)[5] and traded value (VALUE) may be calculated thus:

$$VOL = \frac{\left(VEL/100\right)\cdot MV}{PRICE} \tag{8}$$

$$VALUE = VOL \cdot PRICE \tag{9}$$

The variables described above constitute the set of exogenous factors included within the framework for this paper's analysis of analyst following and institutional ownership.

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[4] For example, firms which have a 'tradition' to uphold (e.g. football clubs) or a significant ecological or social image to maintain.

[5] The use of VOL as a measure of trading activity is described in Section 4 of this paper.

### *2.3. The sample*

The following selection criteria are employed here:

(i) the firm is a member of either the FTSE 100 or FTSE Mid 250 indices;

(ii) all data values mentioned in the above section are available from the appropriate sources, namely the Hemmington-Scott *Equities Direct* website, the I/B/E/S *Summary Data* file for January 1998 and the LBS *Risk Measurement Service* for the quarter ending December 1997. No other restriction is placed on the sample. From a total of 350 firms, the selection criteria eliminate 74 firms, leaving a sample of 276 firms.

Because firms examined in this study are selected from the FTSE 100 and FTSE Mid 250 indices there is a bias toward larger UK firms. The advantage of this design is that the resulting sample of 276 firms is likely to be similar in character to the 251 firms examined in the previous UK study by Marston (1997) which were selected from the UK Top 500. This allows a better test of the hypothesis that the OLS slope coefficients reported in Marston's study may have been affected by simultaneous equation bias.

In addition, a potential problem of having a large number of small companies (e.g. FTSE-Fledgling index members) is that analyst following can become concentrated around low numbers. Many small firms have only one or two analysts contributing to I/B/E/S, while some have none. This does not provide enough variation in the dependent variable for a regression model. Another possible reason to avoid small firms relates to the time and cost of training analysts. Small firms tend to be young firms. If, as this paper is suggesting, a variety of firm characteristics influence the number of analysts following firms, it may take time for the impact of these characteristics to be fully reflected in analyst following.

## 3. The main analysis

This section presents descriptive statistics for the variables used in this study and the exact form of the analyst-following model employed. The main empirical results, based on 3SLS regression, are then presented and described. Finally, the results of OLS regression analysis are presented for comparison with the 3SLS results.

### *3.1. The data*

Descriptive statistics for all variables are contained in Table 1. Some of the variables (NINST, VOL) are not used in the main analysis but are employed in sensitivity tests described later in Section 4. Panel A of Table 1 presents the main descriptive statistics for each variable.[6] Panel B shows the correlation matrix for the variables employed in the main empirical analysis. It is presented here primarily to assess the independence of the explanatory variables. These correlations do not give rise to concerns of multicollinearity affecting the regression-based analysis.[7]

In relation to the measures of analyst following (AF1, AF2) it can be seen that on average, more analysts contribute forecasts for the current-year than for the following year. This may reflect the 'dropping out' of analysts who are thinly spread across many firms. Similarly, analysts working in small or poorly resourced brokerage firms may concentrate their efforts on the current fiscal year and be reluctant to predict further into the future. For most firms, however, inspection of the I/B/E/S database reveals AF1 and AF2 to be similar (often identical) values. Marston (1997) measures analyst following as the number of analysts invited to management meetings, as revealed in questionnaires, and reports a mean analyst following of around 24. The study here uses the number of analysts contributing to the I/B/E/S *Summary Data* file and obtains a mean analyst following of around 12. This could indicate that many UK analysts are not included in the I/B/E/S files or that the number of analysts invited to management meetings is an imperfect measure of the number of analysts actively following a firm. It may also be the result of sample selection bias in the Marston study, since firms were not compelled to respond to the questionnaires.

Table 1 shows that although this sample is drawn from the two largest FTSE indices, there is plenty of variation in firm characteristics (e.g. size, risk, ownership structure). When compared to the descriptive statistics reported by Marston (1997: 340) it appears that ownership structure, measured by the means for insider and major institutional holdings (5.7% and 17.5%, respectively) are not too dissimilar to the results reported here for INSIDE and INST% (3.4% and 26.8%, respectively).

Comparisons can also be made in relation to returns variability (VAR) and the market model $R^2$ (RSQ). Table 1 shows that for this sample, mean returns variability is 25.56% and the mean market model $R^2$ is 19.45%. The mean for returns variability is lower than the 35.21% mean value reported in Marston's study. When one considers

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[6] Measures of analyst following and firm size are log-transformed for the main empirical analysis (see note in Section 3.2) but are included in Panel A in their raw state for ease of understanding.

[7] The largest correlation between explanatory variables is +0.7728 for annualised traded value (VALUE) and firm size (lnMV). The exclusion of VALUE does not affect the main conclusions drawn from the results in Table 2. The use of VOL in place of VALUE does not alter the results.

**Table 1**
**The variables**

*Panel A: Descriptive statistics*

| *Variables* | *Minimum* | *Maximum* | *Mean* | *Median* | *Standard deviation* |
|---|---|---|---|---|---|
| AF1 | 1 | 21 | 12.047 | 12 | 4.696 |
| AF2 | 1 | 22 | 11.826 | 12.000 | 4.658 |
| INST% | 0.00 | 98.07 | 26.838 | 24.165 | 18.712 |
| NINST | 0 | 13 | 3.540 | 3 | 2.105 |
| INSIDE | 0.00 | 56.82 | 3.393 | 0.175 | 8.539 |
| MV | 303 | 55478 | 2730.98 | 1132 | 7386.30 |
| VAR | 12.00 | 77.00 | 25.565 | 24.00 | 8.459 |
| RSQ | 2.00 | 51.00 | 19.449 | 19.00 | 10.172 |
| BETA | 0.44 | 1.42 | 0.966 | 0.97 | 0.176 |
| VOL | 806 | 1.1E+08 | 6.08E+06 | 2.9E+06 | 1.0E+07 |
| VALUE | 0.53 | 55552.77 | 2844.49 | 781.88 | 5291.588 |

| *Dummy variables* | *Dummy = 1* | *Dummy = 0* | *Total* |
|---|---|---|---|
| REG | 68 | 208 | 276 |

*Panel B: Correlation matrix*

| | INSIDE | NINST | lnAF1 | lnAF2 | lnMV | RSQ | VAR | VALUE | REG | BETA | VOL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INST% | −0.1179 | 0.6268 | −0.3488 | −0.3425 | −0.4506 | −0.3974 | 0.2307 | −0.3638 | −0.0145 | −0.1480 | −0.2503 |
| INSIDE | — | −0.0513 | −0.2909 | −0.3038 | −0.2239 | −0.1519 | 0.1304 | 0.1611 | 0.0906 | 0.038 | 0.1702 |
| NINST | — | — | −0.2824 | −0.2723 | 0.5225 | −0.2415 | 0.1666 | −0.3443 | −0.1549 | −0.0565 | −0.2536 |
| lnAF1 | — | — | — | 0.9882 | 0.5165 | 0.3472 | −0.4126 | 0.3828 | −0.0034 | 0.0427 | 0.3101 |
| lnAF2 | — | — | — | — | 0.5225 | 0.3600 | −0.4316 | 0.3979 | 0.0005 | 0.0481 | 0.3175 |
| lnMV | — | — | — | — | — | 0.4431 | −0.3411 | 0.7728 | 0.2624 | 0.1000 | 0.5985 |
| RSQ | — | — | — | — | — | — | −0.6269 | 0.2841 | 0.3374 | 0.5439 | 0.1264 |
| VAR | — | — | — | — | — | — | — | −0.2447 | −0.1329 | 0.0614 | −0.0807 |
| VALUE | — | — | — | — | — | — | — | — | 0.2108 | 0.0141 | 0.8135 |
| REG | — | — | — | — | — | — | — | — | — | 0.2937 | 0.1102 |
| BETA | — | — | — | — | — | — | — | — | — | — | 0.0014 |

AF1, AF2 = number of analysts contributing current-year and next-year forecasts respectively, as reported in the I/B/E/S *Summary Data* file for January 1998; INST% = percentage of shares held by major institutional shareholders; NINST = number of major institutional shareholders; INSIDE = percentage of shares held by insiders; MV = market value of equity (£m); VAR = variability of returns, measured by the standard deviation of returns (%); RSQ = the $R^2$ from the market model; BETA = systematic risk index; VOL = annualised volume of trades; VALUE = value of annualised trades (£m); REG = dummy variable for membership of regulated industries.

- The variables AF1, AF2 and MV appear as log-transformations in Panel B because this is how they are employed in the estimated model (see Table 2).
- Sample: 276 firms from FTSE 100 and Mid 250 indices.

that the samples of firms are not identical, and that the two datasets cover different periods of time, the difference is perhaps not surprising. A more notable difference is observed in the case of the market model $R^2$, which averages 19.45% here but 43.51% in Marston's study. Both this study and Marston's study use the LBS *Risk Measurement Service* as the source for VAR and RSQ data so differences do not reflect differences in the data source.

The dummy variable for those sectors which are subject to regulation (REG) does not have an equivalent in the Marston study, which instead uses four broad industry classifications—*capital goods*, *consumer goods*, *financials* and *others*. Panel A of Table 1 shows that 68 of the 276 firms studied here are classified as utilities or financials.

Systematic risk (BETA) varies between 0.44 and 1.42 for this sample, with a mean of 0.966 indicating that the average risk for this sample is slightly less than for the whole market. Marston's study does not employ systematic risk as an explanatory variable.

### 3.2. *The main model*

This section presents a two-equation model of analyst following and institutional ownership based on the arguments presented in Sections 1 and 2. The equations in this system are linear-additive in form and both analyst following and market value are included as log-transformations. Evidence from previous studies indicates that the use of log-transformations for analyst following (Chung and Jo, 1996) and market value (Bhushan, 1989; Moyer et al., 1989; Chung and Jo, 1996; Marston, 1997) are better suited to linear forms. Thus, the estimated equations are:

$$ln(AF1) = a_1 + a_2 INST\% + a_3\, ln(MV) + a_4 RSQ + a_5 VAR + a_6 REG + a_7 VALUE + \varepsilon \quad (10)$$

$$INST\% = g_1 + g_2\, ln(AF1) + g_3\, ln(MV) + g_4 RSQ + g_5 BETA + g_6 REG + g_7 VALUE + g_8 INSIDE + \upsilon \quad (11)$$

where variables are defined as for Table 1, and $\varepsilon$ and $v$ are random error terms. The above model system (10 and 11) is also re-estimated with the alternative measure of analyst following AF2 in place of AF1.

There are two main differences between the equations for analyst following (10) and institutional ownership (11). Firstly, a different risk measure is used for each. For analyst following a measure of total risk is employed (VAR), while for institutional shareholders systematic risk (BETA) is used. The rationale for this difference was discussed earlier. Secondly, preliminary model testing, not reported here, indicates that the impact of insider ownership (INSIDE) on analyst following operates through its impact on institutional ownership. This point is discussed further in Section 4 of this paper. The model parameters are estimated using 3SLS.

### 3.3. *Empirical analysis: the main model using 3SLS*

This section presents the results of empirical tests based on the main model estimated using 3SLS. The results are shown in Table 2. The main model is estimated using two measures of analyst following: the number of analysts contributing current-year earnings forecasts to the I/B/E/S database (AF1) and the number of analysts contributing next-year earnings forecasts to the I/B/E/S database (AF2). In the following discussion, unless stated otherwise, coefficients are described as statistically significant when it is possible to reject the null-hypothesis (i.e. coefficient equals zero) at the 0.05 level using a two-tail test.

The results of the 3SLS estimation of the main model, presented in Table 2, do not appear to be sensitive to whether analyst following is measured by the number of analysts contributing current-year earnings forecasts to I/B/E/S or next-year earnings forecasts. The following discussion will focus on the results for the model employing *ln*AF1 but is equally valid for the model employing *ln*AF2.

The first point to note is the evidence of a significant positive association between analyst following and institutional ownership (INST%) when investigated within a simultaneous equation framework. This suggests that there is a greater demand for information on firms favoured by institutional investors, since institutional investors are one of the major groups of clients for analysts' services. A positive association between analyst following and INST% is consistent with US findings by Bhushan (1989), Moyer et al. (1989) and O'Brien and Bhushan (1990). It is, however, contrary to the negative association identified in the OLS regression-based UK study by Marston (1997).

Positive slope coefficients are also identified for both market value (*ln*MV) and the market model $R^2$ for a firm's stock returns (RSQ). These results are consistent with *a priori* expectations, and with prior empirical evidence from Bhushan (1989) and Marston (1997). The larger a firm's market value the greater the potential financial gains to information identifying mis-priced securities. The larger a firm's market model $R^2$, the less uncertainty exists regarding a stock's future price movements in relation to the market.

Negative slope coefficients are identified for a firm's total risk, measured by the variability of

**Table 2**
**The main model using 3SLS**

$$ln(AF1) = a_1 + a_2 INST\% + a_3 ln(MV) + a_4 RSQ + a_5 VAR + a_6 REG + \alpha_7 VALUE + \varepsilon$$
$$INST\% = g_1 + g_2 ln(AF1) + g_3 ln(MV) + g_4 RSQ + g_5 BETA + g_6 REG + g_7 VALUE + g_8 INSIDE + \upsilon$$

where variables are as defined in Table 1.

- The above model system is also re-estimated with AF2 replacing AF1.

| *Dependent variables* | *ln(AF1)* | *INST%* | *ln(AF2)* | *INST%* |
|---|---|---|---|---|
| *3SLS model-fit‡* | 12.05% | 16.22% | 12.52% | 17.81% |
| *Explanatory variables* | | | | |
| **Intercept** | −0.420 | 57.36* | −0.473 | 57.27* |
| | (−0.591) | (4.796) | (−0.655) | (4.979) |
| ***ln*(AF1)$^a$ or *ln*(AF2)$^b$** | | 18.155*$^a$ | | 17.157*$^b$ |
| | | (2.044) | | (2.147) |
| **INST%** | 0.0214* | | 0.0230* | |
| | (2.773) | | (2.930) | |
| ***ln*(MV)** | 0.3089* | −8.869* | 0.3064* | −8.482* |
| | (5.093) | (−3.776) | (4.971) | (−3.976) |
| **REG** | −0.3794* | 11.506* | −0.3919* | 11.290* |
| | (−3.625) | (3.398) | (−3.686) | (3.504) |
| **RSQ** | 0.0161* | −0.8041* | 0.0173* | −0.8097* |
| | (2.359) | (−5.552) | (2.500) | (−5.761) |
| **VALUE** | 0.48E-05 | −0.255E-03 | 0.79E-05 | −0.30E-03 |
| | (0.466) | (−0.828) | (0.762) | (−1.002) |
| **VAR** | −0.0109* | | −0.0117* | |
| | (−2.031) | | (−2.139) | |
| **BETA** | | 6.317 | | 6.564 |
| | | (1.538) | | (1.614) |
| **INSIDE** | | −0.3098* | | −3.361* |
| | | (−2.121) | | (−2.157) |

t-values in parentheses
*indicates rejection of the null-hypothesis that the coefficient is zero, at the 0.05 level using a two-tail test
‡The 3SLS measures of model-fit are generated by the statistics programme *Time Series Processor*, TSP International. These $R^2$ values are generated for individual equations within the two-equation model framework.

- Sample: 276 firms from FTSE 100 and Mid 250 indices.

stock returns (VAR), and for the regulated industries dummy (REG). The negative association between analyst following and variability of returns is consistent with the results of the simultaneous equation analysis by O'Brien and Bhushan (1990). A negative association suggests that analysts are less likely to follow volatile stocks. This may be because volatile stocks lead to an increased likelihood of large forecast errors when analysts are predicting future values for stock prices or price-based variables. As a result, analysts face an increased probability of making serious misjudgments when generating buy and sell recommendations. Such errors may have a detrimental impact on an analyst's reputation. Marston (1997) estimates a positive slope for VAR; this difference may be due to the different measures used for analyst following or the different estimation methods, i.e. OLS versus 3SLS. The different signs are not due to the measurement of returns variability; both this study and Marston (1997) use the standard deviation of returns as reported by the LBS *Risk Measurement Service*.

The negative slope for the regulated industries dummy variable (REG) is an interesting finding. It is consistent with the *a priori* expectation that there is less demand for analysis of firms whose behaviour is monitored by external bodies or is well regulated. The variable takes a value of unity for utilities, telecommunications and financials, and a value of zero elsewhere. Of course, it may be that firms in other sectors also face regulation, and that the degree of regulation varies across firms. However, the use of this dummy variable would appear to be sufficient to identify a difference in the general level of analyst monitoring activity between more regulated and less regulated firms.

The remaining explanatory variable from equation 10 is the annualised value of equity trades (VALUE) based on data from the LBS *Risk Measurement Service*. The *a priori* expectation was that analyst following would be greater for firms with heavily traded stocks. Although a positive slope is estimated for this variable, the t-value is not significant at any reasonable probability level. Thus, analyst following does not appear to be significantly influenced by trading activity.

Although analyst following (equation 10) is the primary issue of concern for this study, the main model presented here includes a second equation which explains institutional ownership (equation 11). The results for this equation, also presented in Table 2, provide further evidence of the positive association between analyst following and institutional ownership; the slope coefficient for the measure of analyst following (*ln*AF1) is positive and significant. The results are similar where *ln*AF2 is used as the measure of analyst following. There are a number of other interesting findings in relation to the model explaining institutional ownership. The slope for the regulated industries dummy (REG) is positive and significant. This provides support for the suggestion that the existence of regulation reduces the demand for monitoring by analysts, and also provides non-expert investors (e.g. institutional portfolio managers) with a source of important information which substitutes for information normally provided by analysts.

There is a significant negative association between institutional ownership and the percentage of equity owned by insiders (INSIDE).[8] This suggests that institutional investors are reluctant to invest in firms which are heavily owned by insiders. Thus, the impact of INSIDE on analyst following operates through its impact on institutional ownership.

Finally, there is evidence from the negative slopes for *ln*MV and RSQ, and the positive (though not significant) slope for BETA, that institutional investors may prefer smaller and more risky firms. This contrasts with this study's conclusion that analysts prefer larger and less risky firms. There is some linkage here with the US findings of O'Brien and Bhushan (1990: 75), who conclude that US analysts avoid volatility and that, prior to their pre-experimental expectation, institutions seem to prefer firms whose risk has increased. Professionally managed funds differ in their risk-return profiles so a tendency for UK institutions to favour smaller and more risky firms may simply reflect current investor preferences. In addition, it may be that the very largest firms are more likely to have substantial holdings by small private investors who consider them 'a safe bet'. The results may also be affected by this study's measurement of institutional ownership in percentage terms. Institutional holdings of small firms' stocks are likely to be proportionately higher for trading reasons.

As for analyst following, the results in Table 2 indicate that trading activity (VALUE) has little impact on the institutional ownership of UK firms. The reported t-values indicate that the estimated slope for VALUE is not significantly different from zero at any reasonable probability level.

The explanatory power of the models—around 12% for analyst following and 17% for institutional ownership—suggest opportunities for the model system to be improved. However, the general conclusions gleaned from these results, including the positive endogenous link between analyst following and institutional ownership, appear robust to a number of sensitivity tests (see Section 4).

### *3.4. A note on OLS estimation of analyst following*

One of the main issues addressed by this paper is the endogenous determination of both analyst following and institutional ownership. Such a relationship will cause OLS estimates to be biased and could result in misleading conclusions with regard to the relationship between the two endogenous variables. To investigate this issue, the equation for analyst following (equation 10) is re-estimated using OLS. The results of the OLS analysis are presented in Table 3, together with t-values derived from White (1980), standard errors which are robust to heteroskedasticity.

The results in Table 3 are similar to those obtained using 3SLS, although the slope for the market model $R^2$ (RSQ) is no longer significant. However, the major difference can be seen in the *negative* slope for institutional ownership (INST%). The t-values are not large enough to reject the null-hypothesis at a 0.05 level using a two-tail test, but the results suggest that the negative slope estimated in Marston (1997) may be, in part, the result of simultaneous equation bias in the OLS estimates. Of course, Marston's study uses a different measure of analyst following, and this too may have influenced the results.

## 4. Additional tests and discussion

In this section, a number of tests are conducted to examine the robustness of the results obtained and

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[8] Using *ln*(1 + INSIDE) to measure insider ownership does not alter the results or conclusions.

**Table 3**
**OLS estimation of the analyst following equation**

$$ln(AF1)=a_1+a_2 INST\%+a_3 ln(MV)+\alpha_4 RSQ+a_5 VAR+a_6 REG+a_7 VALUE+\varepsilon$$

where variables are as defined in Table 1.

- The above equation is also re-estimated with AF2 replacing AF1.

| *Dependent variable* | *Intercept* | *INST%* | *ln(MV)* | *REG* | *RSQ* | *VALUE* | *VAR* | *OLS model-fit* |
|---|---|---|---|---|---|---|---|---|
| ***ln*(AF1)** | 1.479<br>(4.781)*<br>[4.777]* | −0.282E-02<br>(−1.720)<br>[−1.411] | 0.1947<br>(5.214)*<br>[6.300]* | −0.1817<br>(−2.825)*<br>[−2.517]* | 0.388E-03<br>(0.106)<br>[0.112] | −0.27E-05<br>(−0.363)<br>[−0.600] | −0.0159<br>(−4.120)*<br>[−3.006]* | R-sq: 36.29%<br>Adj. R-sq: 34.84% |
| ***ln*(AF2)** | 1.512<br>(4.933)*<br>[4.929]* | −0.236E-02<br>(−1.452)<br>[−1.196] | 0.1868<br>(5.049)*<br>[5.965]* | −0.1852<br>(−2.904)*<br>[−2.632]* | 0.905E-03<br>(0.250)<br>[0.261] | 0.9E-07<br>(0.012)<br>(0.018) | −0.0170<br>(−4.416)*<br>[−3.327]* | R-sq: 37.56%<br>Adj. R-sq: 36.17% |

(*x*) denotes OLS t-values; [*x*] denotes t-values based on White (1980) correction for heteroskedasticity.
*indicates rejection of the null-hypothesis that the coefficient is zero, at the 0.05 level using a two-tail test.

- Sample: 276 firms from FTSE 100 and Mid 250 indices.

reported in Section 3. Suggestions for further research are also given.

### 4.1. *Using 2SLS estimation*

An alternative approach to estimating simultaneous equation systems is the 2SLS procedure. Equations within the system are estimated separately using the set of exogenous variables, rather than estimating the equations within the system together. As a result, 2SLS does not take account of the 'other equations' in the system when generating the estimates for an equation. However, 3SLS estimation is more sensitive to model mis-specification because any errors in model specification feed through to the estimates for the other equations in the system. If all equations are exactly (just) identified[9] then 2SLS and 3SLS methods generate identical estimates (Johnston, 1984: 489–490). In the case of the main model here, the equation for analyst following is over-identified while the equation for institutional ownership is exactly identified. In this example, the results for the equation of analyst following (10) using 2SLS are the same as using 3SLS (reported in Table 2). The estimated coefficients for the institutional ownership equation (11) will be different, however. The general conclusions from these untabulated results are the same as those obtained using 3SLS, although the t-values for the positive slope coefficient of *ln*(AF1) and *ln*(AF2) are somewhat reduced.

### 4.2. *Alternative measures of institutional ownership*

The measure of institutional ownership used in the main model is the total percentage of shares held by major institutional shareholders (INST%). An alternative measure of institutional ownership is the number of major institutional shareholders (NINST). This variable is described in Table 1. The variable is discrete and has a range from 0 to 13, but most observations are clustered around a mean of 3.5. The discrete nature of the variable, together with the low degree of variability it displays, means that it may lack power as an explanatory variable in comparison to INST% and also does not possess the characteristics of an ideal dependent variable. In order to assess the impact of this alternative measure of institutional ownership, the main model system (equations 10 and 11) is re-estimated with NINST replacing INST%. The untabulated results are not sensitive to the measure of institutional ownership and are similar to those reported in Table 2. In particular, there remains a significant positive association between analyst following and the new institutional ownership variable NINST.[10]

### 4.3. *Alternative model specification*

A number of additional model specifications were also tested during the development of this research, which are not reported here.

- The main model was re-restimated using the volume of shares traded (VOL) instead of the value of shares traded (VALUE). Both variables are described in Table 1. Coefficient signs and significance levels remain unchanged by this substitution. This is not surprising since the Pearson and Spearman correlation coefficients for VALUE and VOL are 0.814 and 0.848, respectively.
- Tests were conducted on models which included trading activity and market value as endogenous variables. However, the results were weak, suggesting that any element of endogenous determination of these variables is small.
- The measure of insider ownership (INSIDE) is excluded from the equation for analyst following (equation 10) in the main model tested here. Inclusion of INSIDE in equation 10 means that both equation 10 and equation 11 are exactly identified and so 3SLS and 2SLS generate identical results. The inclusion of INSIDE[11] in equation 10 does not alter the signs of any of the coefficients relative to those presented in Table 2. All significant slopes for the INST% equation (11) remain significant, but t-values are much reduced for the analyst-following equation (10). These results suggest that the importance of insider ownership is in relation to its impact on institutional ownership.

### 4.4. *Further research*

Several avenues appear feasible in relation to the future study of analyst following. The development of the theoretical framework within which analyst following is determined would appear to be one important area for further research. Most empirical studies utilise explanatory variables selected from a set of 'obvious candidates'. Developments of a theoretical framework for the decision-making of both individual analysts and brokerage houses may provide an additional insight into the determination of analyst following.

Empirical developments of this research area may include the testing of multiple equation system models of analyst following. However, scope for the development of such models may be limited if the number of strong endogenous relationships is small. There is also scope for investigating how analyst following may impact on pricing efficiency. For example, work by Rajan and Servaes (1997) suggests that the underpricing of initial public offerings (IPOs) may be influenced by analyst following.

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[9] In most cases we can say that an equation is exactly identified when $K-M = G-1$, where K is the number of all variables within the system; M is the number of all variables within a particular equation; G is the number of individual equations within the model system. If $K-M > G-1$, the equation is over-identified.

[10] Using *ln*(1 + NINST) does not improve the explanatory power of the models.

[11] The coefficient for INSIDE when added to equation 10 is positive, contrary to expectations, but the t-value of 0.293 is insignificantly different from zero at any reasonable probability level.

A third approach to the study of analyst following is through interviews and surveys of analysts. These can yield valuable insights into the workings of financial institutions which may not be detectable through model-based empirical analysis alone. In addition, interviews may provide explanations for relationships which have been identified through empirical analyses. Interviews may be constructed so as to build upon knowledge gleaned from empirical studies. The results of interviews and surveys may then be useful in the development of future theoretical and empirical models of analyst following. Of course, one major drawback to the use of surveys and interviews is the difficulty of gaining access to decision makers. In addition, analysts may give evasive answers to questions which reveal their specialist techniques or their ignorance. Using empirical analysis, it is possible to see what analysts actually do rather than what they may say they do.

## 5. Conclusion

This study empirically investigates the determinants of analyst following among UK Top-350 companies as of January 1998. Analyst following and institutional ownership are modelled as endogenous variables within a two-equation system. Using 3SLS estimation, a significant positive association is identified between analyst following and institutional ownership, which contrasts with prior OLS regression-based UK research. In addition, the results also suggest that analyst following is greater for larger and less risky firms, mirroring US findings by O'Brien and Bhushan (1990). The demand for analysts' services appears to be significantly less for industries where firms' activities are more tightly regulated or prescribed. The degree of insider ownership is relevant to the issue of analyst following because of its significant negative association with institutional ownership. Contrary to pre-experimental expectations, this study finds no evidence that trading activity significantly influences analyst following or institutional ownership. Overall, the results of this study suggest that the determination of analyst following for UK firms should be examined within a framework which allows for an endogenous relationship with institutional ownership.

## References

Arnold, J. and Moizer, P. (1984). 'A survey of the methods used by UK investment analysts to appraise investments in ordinary shares', *Accounting and Business Research* (Summer): 195–207.

Basi, B. A., Carey, K. J. and Twark, R. D. (1976). 'A comparison of the accuracy of corporate and security analyst forecasts of earnings'. *The Accounting Review* (April): 244–54.

Bhaskar, K. N. and Morris, R. C. (1984). 'The accuracy of brokers' profit forecasts in the UK'. *Accounting and Business Research* (Spring): 113–24.

Bhushan, R. (1989). 'Firm characteristics and analyst following'. *Journal of Accounting and Economics*, 11: 255–274.

Brennan, M. J. and Hughes, P. J. (1991). 'Stock prices and the supply of information'. *Journal of Finance* (December): 1,665–1,691.

Brown, L. D., Richardson, G. D. and Schwager, S. J. (1987). 'An information interpretation of financial analyst superiority in forecasting earnings'. *Journal of Accounting Research* (Spring): 49–67.

Brown, L. D. and Rozeff, M. S. (1978). 'The superiority of analyst forecasts as measures of expectations: evidence from earnings'. *Journal of Finance*, (March): 1–16.

Chung, K. H. and Jo, H. (1996). 'The impact of security analysts' monitoring and marketing functions on the market value of firms'. *Journal of Financial and Quantitative Analysis* (December): 493–512.

Foster, G. (1986). *Financial statement analysis* (2nd edition). Englewood Cliffs, NJ: Prentice-Hall.

Freeman, R. N. (1987). 'The association between accounting earnings and security returns for large and small firms'. *Journal of Accounting and Economics*, 9 (July): 195–228.

Griffiths, W. E., Hill, R. C. and Judge, G. G. (1993). *Learning and Practising Econometrics*. New York: John Wiley & Sons, Inc.

Johnston, J. (1984). *Econometric Methods* (3rd edition). ISE: McGraw-Hill.

London Business School. *Risk Measurement Service: October–December 1997*. London: LBS.

Marston, C. (1996). *Investor Relations: Meeting the Analysts*. Research Report for the Institute of Chartered Accountants of Scotland.

Marston, C. (1997). 'Firm characteristics and analyst following in the UK'. *British Accounting Review* (December): 335–347.

McNichols, M. and O'Brien, P. (1997). 'Self-selection and analyst coverage'. *Journal of Accounting Research*, 35. Supplement.

Mikhail, M. B., Walther, B. R. and Willis, R. H. (1997). 'Do security analysts improve their performance with experience?' *Journal of Accounting Research*, 35. Supplement.

Moyer, R. C., Chatfield, R. E. and Sisneros, P. M. (1989). 'Security analyst monitoring activity: agency costs and information demands'. *Journal of Financial and Quantitative Analysis* (December): 503–512.

O'Brien, P. C. and Bhushan, R. (1990). 'Analyst following and institutional ownership'. *Journal of Accounting Research* 28 (Supplement): 55–76.

Pike, R., Meerjanssen, J. and Chadwick, L. (1993). 'The appraisal of ordinary shares by investment analysts in the UK and Germany'. *Accounting and Business Research*, (Autumn): 489–499.

Rajan, R. and Servaes, H. (1997). 'Analyst following of initial public offerings'. *Journal of Finance* (June): 507–529.

White, H. (1980). 'A heteroskedastic-consistent covariance matrix estimator and a direct test for heteroskedasticity'. *Econometrica*, (May): 817–828.

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# An empirical evaluation of the interpersonal and organisational correlates of professionalism in internal auditing

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**Abstract**—This study was designed to evaluate the extent of professional attitudes in internal auditors and to identify their association with interpersonal and organisational conditions of internal auditing. For these purposes, the generic features of internal auditing jobs were used to evaluate how the internal audit function is designed, and role stressors were used to capture expectations of role senders. It was hypothesised that job characteristics would generally be negatively associated with role stress and positively related to professionalism. Furthermore, role stress was hypothesised to be negatively related to professionalism. At a practice level, the results indicate that autonomy, feedback, and task significance from the set of job characteristics, and role conflict and role ambiguity from role stress, are related to some of the dimensions of professionalism. Only the relationships between role conflict and two professionalism dimensions were not in the hypothesised direction. The strongest support for the hypothesised relationship between job characteristics and role stress was found for skill variety, autonomy, and feedback. All were significantly related to all dimensions of role stress. However, skill variety was positively related to each dimension of stress. The results indicate that a complex set of work design factors have selective importance for creating and maintaining professional attitudes and behaviours of internal auditors.

## 1. Introduction

Internal auditing has achieved recognition as an important corporate and societal function in many forums. However, the acknowledgement of internal auditors as a profession has lagged far behind that of public accounting. The achievement of professionalism by internal auditors is an important issue to current practitioners, future recruits to the occupation, and to those entities that depend on the work of internal auditors. It may also bear upon the attainment of future performance expectations by this group.

Normative arguments about what constitutes a profession are not productive (see Cogan, 1955). Since this paper proposes an empirical examination of the process by which professionalism occurs, agreement about this term is essential. For these purposes, the development of professional attitudes and behaviours is posited as a necessary, albeit not sufficient, threshold of attaining professional status. Whereas the identification of a *profession*, and of *professionals*, are inter-related issues, they also are capable of conceptual separation (Ritzer, 1973). This research focuses upon the second of these issues. In order to achieve professional status, an occupation's member must aspire to the attitudes of professionalism before other factors can be considered. This paper attempts to locate answers about the professionalisation process within interpersonal and organisational conditions. This effort is motivated by the fact that internal auditing is not a free-standing endeavour, but is instead part of its client entity.

This paper is organised into four sections. The first reviews the literature in order to introduce the concepts used by the research and to develop specific hypotheses. The next two sections describe the nature of the empirical study and the results of that work. The final section discusses the results and their major implications.

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## 2. Literature review and hypothesis development

The purpose of this section is to introduce the professionalism construct, as it applies to internal auditors. The possible correlates of professionalism are also developed.

### 2.1. Professionalism

Professional status conveys prestige and privilege upon members of an occupation. However, such a condition cannot be accomplished through the strategic unilateral actions of an occupational group. Burrage et al. (1990) develop professional status as a historically unique confluence of exchange transactions among the state, practitioners, academics, and clients. Such an analysis indicates the level of complexity involved in approaching the professional question.

The issues raised by debates about professionalism are essentially normative and political. However, they all pertain to group characteristics and group privileges. The present study does not conduct its primary analysis at the group level. Instead, this paper directly addresses the professionalism of individuals in internal auditing. Professional attributes at the individual level can be considered a necessary, although not sufficient, condition for the development of a profession at the group level (Burrage et al., 1990). In other words, since individuals comprise groups, the group's status may be predicated in part on the aggregated tendencies of its individual members. Even if the group's ability to claim and sustain professional status transcends the individual level of analysis, the attitudes and inspirations of members cannot be ignored.

The conventional sociological literature has evolved a consensus impression of a multi-dimensional professional model from the perspective of the practitioner. In this view, professionals should be *dedicated* to their work. This attribute plays an especially critical role for occupations whose social contributions are not yet fully appreciated by outsiders. Practitioners without a belief in the importance of their work will not be successful apostles, nor can they expect those less familiar with their contributions to value them more. Second, professionals are expected to commit their service to the *welfare of society*, even when such necessitates compromise of personal gain opportunities. Goode (1957) specifies that practice in deference to social welfare is the necessary exchange for the confirmation of monopoly privilege. Third, professionals should support their vocational *autonomy*. Since professional status implies the exclusive rights to some action, practitioners should assert the righteousness of this division of labour. They should oppose any threat that would constrain their discretion and supervene their judgement pertaining to their work. A fourth characteristic of the professional mind-set involves support for *self-regulation*. If practitioners believe themselves in a superior position regarding the knowledge invoked in the work, they should also advocate the suspension of lay judgement pertaining to its adequacy. Finally, professionals should develop primary *contact and involvement* with other professionals. Professions are communities in which a shared set of values are developed and nurtured. This dictates that people who adopt professionalism will seek the association of similarly situated others more than will members of non-professional occupations.

The application of the classic professional model to internal auditors presents an empirical issue. What these individuals believe remains unknown despite constant advocacy of increased professionalism and reports of occupational progress toward professionalism (see, for example, Wilson and Wood, 1988; Chambers et al., 1987). However, the application of this professional model to internal auditing may be imperfect. The above characteristics, collectively referred to as professionalism, were developed from practitioners of occupations that have achieved broad and long-lived recognition of their professional status. Although each occupation has its own idiosyncracies and historical context, this model of professionalism provides an initial means of ascertaining an important intra-occupational state. More attention to the unique situation of internal auditors will be related in the choice of correlates for the professionalisation process.

### 2.2. Role-based correlations

Professions exist by virtue of the expectations that are made upon certain individuals and the relative freedom that they are given to perform. Because the tradition of the free-standing professional or professional organisation prevailed, this never had to be explicitly considered. Contractual relationships defined professional performance. However, when organisations subsume whole professions, the conditions under which professions can operate is structurally mediated (see Hopper, 1980).

The interpersonal aspects of work centre around the conception of organisations as situated roles (see Katz and Kahn, 1966). Roles imply a set of expectations for behaviour which are imperfectly communicated and potentially dysfunctional (see Kahn et al., 1964). This condition, sometimes labelled role stressors, can be analytically divided into issues of clarity (role ambiguity), inconsistency (role conflict), and magnitude (role overload).

A vast literature has linked these conditions to a large set of work experience outcomes (see reviews by Schuler and Jackson, 1985; Fisher and Gitelson, 1983; and van Sell et al., 1981). The expectation that role stressors will also be related to professionalism for internal auditing finds its basis in conflicts between professional and organisational norms (see Chambers, 1995; Chambers et al., 1987; Barber, 1963), the high degrees of uncertainty in professional endeavors (see Lortie, 1975), and the heavy work loads typically imposed upon professionals (see Cullen, 1978). Wade (1967) expected role strain to undermine the development of professional norms. In a similar tradition, the professional is seen to be torn between local (i.e. organisational) and cosmopolitan orientations (Gouldner, 1957; Goldberg, 1976).

The nature of professionalism is itself rooted in tension and strain. Professionals often experience conflicting senses of duty (see Dyckman, 1974; Cogan, 1955). Conflict sometimes reflects client status (Abbott, 1988) and entails certain degrees of pressure to abandon professional goals (Barber, 1963). In organisations, non-professionals in the chain of command may present this dilemma. However formulated, the expectations of all role senders should not be assumed to be consistent.

Another dimension of orienting professionalism toward critical external party perceptions involves the performance contingencies in a more direct way. Professionalism entails a certain degree of decision-making, but in a way that is not exclusively technical (Paton, 1971). Nonetheless, excessive indeterminacy in the work may interfere with the emergence of professional authority (Beckman, 1990). External parties must provide sufficient contours for the work of professionals, especially when contextualised by a common organisational agenda.

Professionalism makes heavy demands upon its adherents. Special talents brought to bear in situations of great importance can be personally invigorating. However, in certain magnitudes, these demands can be crushing. Part of the problem is an organisational unawareness of the extra burden carried by individuals with joint responsibilities to organisation and profession.

Although role stressors are generally conceived as deleterious irritants which forestall the development of positive work outcomes (e.g., Regoli and Poole, 1980), their impact upon professionalism is made less certain by the expectation of practitioners of inherent levels of uncertainty, friction, and preoccupation. Furthermore, role stressors can be managed by professionals through the embracing of selective aspects of their roles (Corwin, 1961; Barber, 1963).

Despite some inituitive recognition that role stress and professionalism are intertwined for internal auditors (see Sawyer, 1991; Kasel and Deyoub, 1983), no previous empirical evidence clarifies this important relationship. However, Wilson and Wood (1988), in an exhaustive study of internal auditing, identify role stressors as very consequential and a pervasive phenomenon. If professionalism is consistent with other outcomes such as job satisfaction, organisational commitment and turnover intentions (see Kalbers and Fogarty, 1995), a large body of work on public and management accountants supports the belief that role stressors have negative consequences (see Strawser et al., 1982; Senatra, 1980; Collins and Killough, 1992). Following the studies closest to the internal auditing context, the first hypothesis may be stated as:

**$H_1$: Internal auditors reporting high levels of role stressors will report low levels of the dimensions of professionalism.**

This hypothesis will necessitate a preliminary explication of the dimensionality of the role stressors (see Netemeyer et al., 1990; McGee et al., 1989) for internal auditors. Following this inquiry into the nature of role stressors, the test of this hypothesis will assess the extent to which the dimensions of professionalism are products of the interpersonal dynamics of role expectation transmission. Thus configured, this hypothesis attempts to bridge the intra-organisational literature on role stress with the largely inter-organisational literature on professionalism.

### 2.3. *Work-based correlations*

Professionals who are autonomous from their clients are free to organise as best they can in order to deliver quality service. Those that exist wholly within their client organisations do not have this freedom. They instead possess job descriptions that are not always dictated by professional considerations. For such occupations, a closer examination of these contours is appropriate.

The job characteristics model (Hackman and Lawler, 1971) proffers the existence of a set of generic attributes of work for the purpose of explaining work outcomes. Positions within organisations possess varying degrees of skill variety, autonomy, feedback, task significance, and task identity. A large corpus of research has linked these attributes with a wide set of positive outcomes (see reviews by Fried and Farris, 1987; Loher et al., 1985; Griffin, 1982; Cummings, 1982). In this light (see Kalbers and Fogarty, 1995), the elements of job design which determine the expression of the job characteristics should influence the degree of professionalism experienced.

The opportunity for job experienced autonomy is expected to be the most prominent element (see Bishop, 1977; Meiksins and Watson, 1989; Bullard and Snizek, 1986). Autonomy creates deference and, *ceteris paribus*, makes the professional more crucial to the client's purpose (Freidson, 1986). Antithetically, loss of autonomy tends to be associated with deprofessionalisation (Toren, 1975). In fact, the standards for internal auditors require that they not subordinate their audit judgement to others (Institute of Internal Auditors, 1978, p. 14). However, bureaucratic control such as is exerted within corporations makes a full sense of autonomy for individual practitioners difficult to imagine.

Although evidence is scarce, those who experience the opportunity to use a broad set of skills pertaining to an identifiable and socially important subject matter would appear more likely to develop or maintain professional attitudes. Problems given to professions tend to be multidimensional and highly dependent upon the ability to invoke a complex knowledge base (Armstrong, 1985). The type of expertise that develops adheres to the role occupant rather than to the position if it is sufficiently diffuse (Montagna, 1974; Beckman, 1990). However, professions may be less dependent upon feedback since they are preconditioned by their training to absorb uncertainty (see Fox, 1957).

The importance of the task given to a profession is consequential in the status that it promises. Work that is important should not only be highly rewarded but should also convey to its doer important psyche rewards. For these purposes, the social significance of work changes over time (Toren, 1975), partially in response to changes in economic organisation (Johnson, 1977). A similar dynamic may link the perceived importance of an individual's work with potential for the emergence of professional attitudes. Ample intuitive links connect the descriptions of work contained by the job characteristics model and the professionalism prototype of professional attitudes and beliefs. More formal courses and programs in internal auditing have been added to the accounting curriculums in some colleges and universities in recent years, most notably in the UK and US. However, to date, most practising internal auditors have not come through that process (Chambers et al., 1987; Foster and Greenawalt, 1995). Therefore, given the relative brevity of their formal training, and the organisationally delimited approach to the work, the extent internal auditors with professional-like parameters in their work may develop a set of corresponding normative attitudes remains uncertain.

**$H_2$: Internal auditors who perceive higher degrees of job characteristics will report higher levels of the dimensions of professionalism.**

Again, the dimensionality of the job characteristics model for internal auditors might depart from *a priori* expectations (see Dunham, 1977; Fried and Farris, 1987) and must be considered prior to the test of hypotheses. The central point remains, however, that professionalism should be structurally approached for the internal auditing occupation.

### 2.4. Intercorrelation effects

Beyond the identification of different correlates of professionalism in internal auditing (i.e., Hypotheses 1 and 2) lies the construction of an integrated view of professionalism. Since role-based and work-based elements occur simultaneously, how they combine to shape professionalism requires treatments beyond the less integrative approaches offered by the previous single theory hypotheses.

Several studies have examined the relationship between job characteristics and role stress variables. None of these studies have involved internal auditors, and therefore their guidance can only be general. Recognition of the relevance of job attributes for role stress extends back to the earliest systematic treatments of role dimensions in organisations (Kahn et al., 1964; Katz and Kahn, 1966). However, these sources failed to provide any empirical evidence on the nature of this relationship.

Schuler (1977) reasoned that role stress relates to the nature of the task and the position of the task in the organisation. Different jobs in varying settings make different job characteristics more or less likely to produce conflict, ambiguity, and overload (Evans et al., 1979). However, most of the findings in this area of research involve less than the full set of job characteristics. Most of the attention has been directed at feedback. Knowledge of the success of past results mitigates uncertainty about future role performance. Therefore, high feedback will be associated with low stress. This has been shown in several studies, including Solomon (1986) and Fry and Hellriegal (1987), and Singh (1998). Moch et al. (1979) demonstrate the importance of feedback beyond its specific target. Individuals lower in the chain of command experience lower role stress when more feedback is provided by superiors. Some studies note that feedback correlates only with role ambiguity. Oliver and Brief (1977), using path analysis, found the relationship between feedback and role ambiguity to be much stronger than the feedback-conflict relationship. Similarly, Bamber et al. (1989) found that communication adequacy reduced role ambiguity.

Other job characteristics have also been related to role stressors. Singh (1998) found higher levels of autonomy to be related to lower levels of role ambiguity, role conflict, and role overload. If autonomy is captured by the concept of personal control, Fry and Hellreigal (1987) and Oliver and Brief (1977) can be interpreted as linking it to lower role stress. In both of these studies, role conflict is the stronger role stress correlate. Senatra (1980) and Bamber et al. (1989) found that adequacy of authority reduced role conflict. However, Bartol (1979) failed to find a significant relationship between autonomy and role stress. Likewise, Bamber et al. (1989) found that task variety was unrelated to role stress.

Sufficient evidence exists to support a relationship between several job attributes and levels of role stress. Insufficient autonomy evidently creates additional conflict and ambiguity. Likewise, dysfunctional feedback appears to be associated with all the forms of role stress. Prior literature suggests the *a priori* exogenous treatment of the job attributes. This perspective, wherein generic job features delimit and constrain role-based variables, is much more reasonable than the converse (see Oldham and Hackman, 1980). Role-based constructs should be more proximate to emergent perceptions of professionalism than organisational factors. Pei and Davis (1989), studying the commitment of internal auditors, found that role stress was more proximate than organisational structure.

Based on the above reasoning, the following final hypothesis is needed to link the unique elements of the first two hypotheses and thereby round out our approach to professionalism:

**$H_3$: Internal auditors who perceive higher levels of job characteristics will perceive lower levels of role stressors.**

Figure 1 provides a recapitulation of the hypotheses, including an explicit labeling of the expected dimensions for job characteristics, role stressors, and professionalism. Job characteristics are hypothesised as antecedents to role stress. The argument that job characteristics and role stress are necessarily antecedents to professionalism is less convincing. In practice, it is more likely that there is an association over time among the dimensions of professional and other components of the model in Figure 1. With the understanding that the direction of causality implied by the model as drawn is debatable, the strength of the relationships can nevertheless be examined. If empirical support for all these dimensions exists, a large number of separate relationships is possible. The exploratory nature of this work makes it necessary to risk the likelihood that many will prove not significant. The three hypotheses provide a means to evaluate the classic conception of professionalism for a group whose practice is subsumed by corporate organisations not primarily concerned with furthering professional claims, but intent on using their contributions.

## 3. The study

Data were collected from internal auditors employed in organisations headquartered in the midwest region of the US. In total, 498 questionnaires were distributed to internal auditors employed by 13 organisations. The sampling frame was designed to ensure a broad base of respondents and to mitigate any idiosyncratic aspects of internal auditing practice within individual organisations.

Where possible, previously validated instrumentation was used. However, the concern with validity had to be balanced with the necessity of capturing the unique aspects of the internal auditing context. The specific sources of items for the research were:

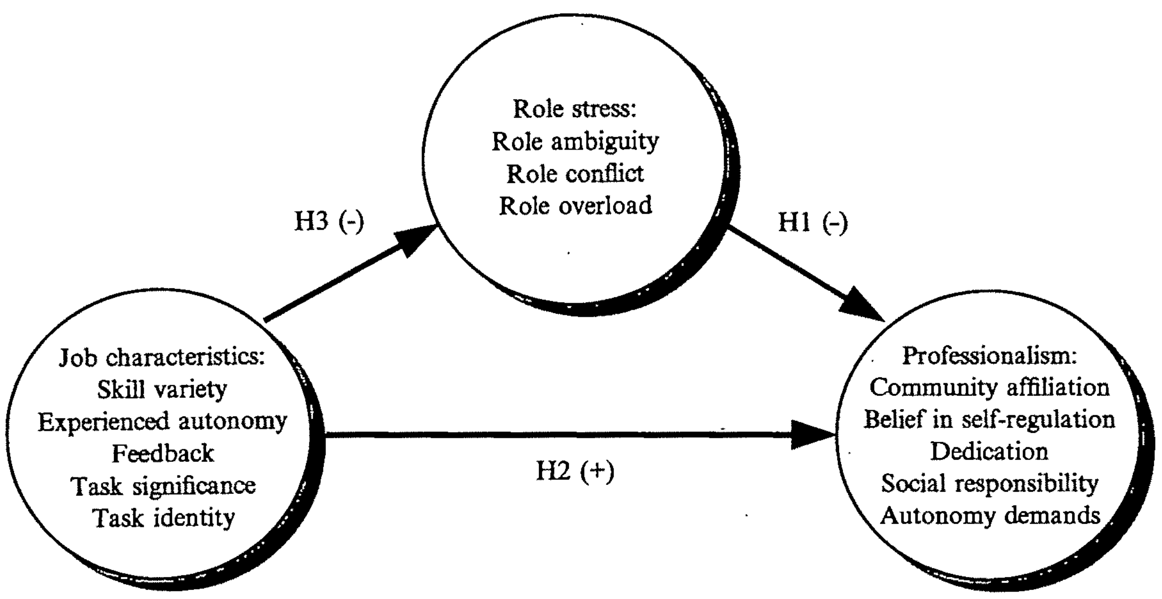
1. Professionalism: 20 items from Hall (1968).
2. Role conflict/ambiguity: 10 items from Rizzo et al. (1970).
3. Role overload: five self-designed items.
4. Job characteristics: 11 items from Hackman and Oldham (1975).

Validation information for the established scales can be found in Snizek (1972) and Morrow and Goetz (1988) [professionalism], Kelloway and Barling (1990) [role stress], and Pierce et al. (1986) [job characteristics]. Table 1 contains the items used to measure professionalism.

Structural equation models (SEMs) were used as the primary method of data analysis (LISREL, Jöreskog and Sörbum, 1989; AMOS, Arbuckle, 1997). SEMs techniques minimise the confounding of structural and measurement parameters by carefully distinguishing between latent constructs and measured variables. This makes it particularly suitable for the analysis of non-experimental observations (see Jöreskog, 1978; Kuveri and Speed, 1982; Miller et al., 1988). This is accomplished by providing an explicit consideration of measurement error. Insofar as these techniques require a precise expression of all the expected relationships among theoretical constructs, there can be fewer implicit assumptions and less selectivity among hypotheses.

SEMs typically assess the hypothesised model through a maximum likelihood procedure that compares the correlation matrices of the constrained model to the observed, unconstrained set of relationships, using various criteria values. Although there is no one agreed-upon standard by which to judge the fit of a model, commonly accepted guidelines exist for several types of fit statistics (see, for example, Gerbing and Anderson, 1993). These differences are expressed in terms of a residual matrix that can be summarised with a variety of fit statistics such as the Goodness of Fit (GFI), the Comparative Fit Index (CFI), and the Incremental Fit Index (IFI), each of which are slightly different calculations of fit. Although better fit is indicated by results closer to 1.00 for all

**Figure 1**
**The hypothesised model of correlates of professionalism**



of these, only rules of thumb exist for ascertaining absolute fit. The procedure, however, is not invariant of sample size, tending to reject models with small residuals when sample size is large (Hughes et al., 1986). Furthermore, unless poor-fitting items are culled in preliminary screening procedures, fit will appear lower than conventional thresholds. Therefore SEMs are more often used to compare alternative nested versions of hypothesised models.

Although there are several means of conducting this comparison (Bentler and Bonett, 1980), one of the more intuitively pleasing is the chi-square difference distributed over the difference of the relative degrees of freedom. This procedure, which can be called a chi-square ratio test (CSR), provides a measure of change in chi-square per degree of freedom for the assessment of a specified increase or decrease in the number of model parameters, thus contributing to its ability to test hypotheses adequately (Hayduk, 1987). Typically, a hypothesised set of relations serves as the full model. From this, paths among variables found individually not significant are 'trimmed'. This trimming, in turn, produces a nested alternative that is a more parsimonious expression of the important relations in the model. More technical descriptions of SEM applications in the accounting literature include Lambert and Larcker (1987) and Lanen and Larcker (1992).

A different approach to model fit is the use of population discrepancy. The root mean square error of approximation (RMSEA) provides a measure of the discrepancy per degree of freedom. Browne and Cudeck (1993) believe that 'a value of the RMSEA of about 0.05 or less would indicate a close fit of the model in relation to the degrees of freedom', but a value in excess of 0.1 indicates a poor-fitting model.

The SEMs methodology and the detailed instruments used for the measure of all the variables enable the explicit consideration of measurement error. Rather than make the conventional assumption that the construct is captured perfectly by the measurement, this association is treated as an empirical matter. Re-examination of data by relaxing the assumption of perfect measurement is capable of altering the substantive conclusions of research that assumed no measurement error (Williams and Hazer, 1986; Gregson, 1992).

## 4. Results

A complete set of data for the observed items was obtained from 417 internal auditors. This represented a 83.7% response rate, which compares favourably with all other known studies of this occupational group. No response bias could be detected using the conventional technique of comparing early and late respondents (see Oppenheim, 1966).

Before testing the proposed hypotheses within the model as a whole, standard reliability measures and confirmatory factor analysis were used to

**Table 1**
**Professionalism items**

**Community affiliation**
- I subscribe to, and systematically read, internal auditing journals and other professional publications.
- I regularly attend and participate in meetings of the local chapter of the Institute of Internal Auditors.
- I often engage in the interchange of ideas with internal auditors from other organisations.
- I believe that more internal auditors should support the Institute of Internal Auditors.

**Belief in self-regulation**
- Standards for the professional behaviour of internal auditors are not equally applicable to all organisations.
- Internal auditors have no reliable way of judging each other's competence.
- The Institute of Internal Auditors should have the power to enforce standards of conduct for internal auditors.*
- One internal auditor is a better judge of another internal auditor than a non-internal supervisor would be*

**Dedication to the profession**
- I am gratified when I see the dedication of my fellow internal auditors.
- It is encouraging to see an internal auditor that is idealistic about his or her work.
- It is difficult to be enthusiastic about the kind of work that I do.
- I would stay in internal auditing even if I had to take a slight pay cut in order to do so.

**Responsibility to society**
- Internal auditing is essential to the welfare of society.
- The importance of internal auditing is sometimes overstated.
- Not enough people realise how vital internal auditing is.
- Any weakening of the role or independence of internal auditing would be harmful to the public.

**Autonomy demands**
- Internal auditors ought to be given the opportunity to make decisions about what is to be audited.
- The judgment of an experienced internal auditor should not normally be second-guessed by his or her supervisor.*
- The conclusions made by internal auditors are rightly subject to detailed review by their supervisor.*
- Internal audit staff should be allowed to make significant audit decisions without the intervention of those outside of the department.

*These items did not adequately load on the related construct and were deleted for purposes of empirical analyses of hypotheses.

evaluate the structure of the job characteristics, roles stress, and professionalism in internal auditing. In this process, two items were dropped from both the professionalism constructs of belief in self-regulation and autonomy demands. These two professionalism constructs still exhibited the lowest reliability coefficients. However, the results of confirmatory factor analysis support the *a priori* five-factor model of professionalism, the three-factor model of role stress, and the five *a priori* job characteristics. Therefore, these conditions did not force departure from the conclusion that the hypotheses testing could be conducted in conformity with the Figure 1 *a priori* depiction of the latent variables. Table 2 presents descriptive statistics and reliability coefficients for all constructs.

### *4.1. Test of hypotheses*

AMOS was used to conduct the empirical tests of the relationships among job characteristics, role stress, and professionalism. The results are summarised in Figure 2. This depiction represents the culmination of a process that left only statistically significant individual relationships while still providing adequate fit statistics for the model as a whole.[1]

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[1] Results may be sensitive to measurement error of individual constructs, model specification, and the resulting overall model fit. RMSEA and the chi-square ratio for the model disclosed in Figure 2 are well within rules of thumb for good-fitting models. The other fit indices presented in Figure 2 are somewhat less than 0.90, a common rule of thumb target for those meas-

**Table 2**
**Descriptive statistics and reliabilities of constructs**

| *Construct* | *No. of items* | *Mean* | *Standard deviation* | *Reliability coefficient* |
|---|---|---|---|---|
| Skill variety | 2 | 5.50 | 1.14 | .54 |
| Autonomy | 2 | 5.37 | 1.25 | .60 |
| Feedback | 2 | 4.46 | 1.64 | .75 |
| Task significance | 3 | 5.11 | 1.24 | .67 |
| Task identity | 2 | 5.15 | 1.43 | .60 |
| Role ambiguity | 5 | 3.11 | 1.27 | .80 |
| Role conflict | 5 | 4.11 | 1.08 | .53 |
| Role overload | 5 | 4.12 | 1.17 | .76 |
| Community affiliation | 4 | 3.49 | 1.28 | .68 |
| Belief in self-regulation | 2 | 4.94 | 1.23 | .23 |
| Dedication | 4 | 4.40 | 1.02 | .70 |
| Social responsibility | 4 | 4.89 | 1.07 | .58 |
| Autonomy demands | 2 | 5.16 | 1.18 | .36 |

A negative relationship was expected between role stress and professionalism in Hypothesis 1. In total, only three of the possible 15 relationships between the three factors of role stress and the five dimensions of professionalism are significant ($p<.01$). Only one of these significant effects is in a direction consistent with the expectation that role stress is antithetical to professionalism. Role ambiguity is significantly and negatively related to the dedication dimension of professionalism. However, higher role conflict is associated with higher community affiliation and with the autonomy demands of the occupation. Role overload fails to be related to any of the elements of internal auditor professionalism.

Hypothesis 1 must be rejected. Only the relationship between role ambiguity and dedication fit Hypothesis 1. Here the evidence suggests that the lack of clarity in expectations is associated with the low development of professional dedication.

Since the empirical exploration of job characteristics supported the five *a priori* characteristics, Hypothesis 2 involves the possibility of 25 significant effects upon professionalism. Figure 2 identifies the seven relationships that prove significant ($p<.01$). Autonomy, feedback, and task significance are each associated with at least two professionalism constructs, all in the hypothesised direction. Two dimensions of job characteristics, skill variety and task identity, are unrelated in any direct way to aspects of professionalism.

Autonomy demonstrated the strongest relationship to professionalism. Those internal auditors with higher levels of job autonomy were more likely to demand autonomy for their profession, to associate with other internal auditors outside of their organisation, and to be dedicated to their profession. Feedback and task significance were each positively associated with two professionalism dimensions. The greater the feedback available in the internal audit position, the more likely an internal auditor was to report a higher level of activity in the internal auditing community and to espouse the belief that internal auditing should be self-regulating. Furthermore, the more significance individuals saw in their jobs, the more likely they were to ascribe societal responsibility to the internal auditing profession and the more they reported dedication to that calling.

In sum, Hypothesis 2 received partial support. The importance of job characteristics for the development of professional positions among internal auditors is selective, rather than universal. This result may also be partially explained by the intervening nature of role stress.

Hypothesis 3 suggests that job characteristics are mediated through the interposition of role-stress. There are 15 possible effects between job characteristics and role stress. Figure 2 shows that nine of these associations merit retention in the best model ($p<.01$, one relationship at $p<.05$). Task significance and task identity were not associated with any type of role stress. Feedback and autonomy both were related to all three types of role stress in the hypothesised direction. These two job components are evidently key to reducing

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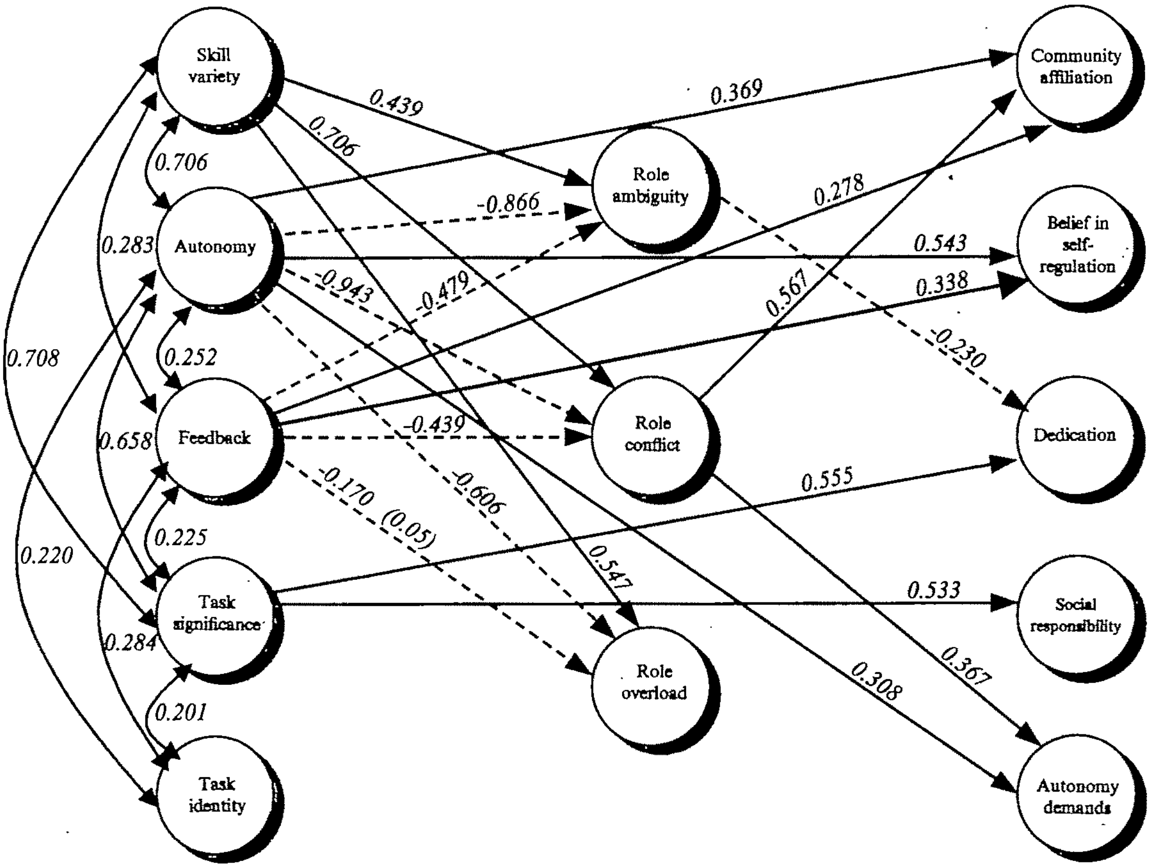
ures. To test the robustness of the results of the model presented in Figure 2 and discussed in the remainder of this section, the model was also run after eliminating the two constructs with the lowest reliability presented in Table 2 (belief in self-regulation and autonomy demands). Results provided modest improvement in all fit measures (GFI = 0.884, AGFI = 0.865, CFI = 0.885, IFI = 0.887, RMSEA = 0.040, and chi-square ratio = 1.67). More importantly, there were no measurable changes in the direction, magnitude, or statistical significance of the other relationships in the model.

**Figure 2**
**The empirically derived model of correlates of professionalism**



——— Positive association
- - - - - - Negative association
All relationships are significant at $p<0.01$, unless specified
GFI = 0.868; AGFI = 0.848; CFI = 0.856; IFI = 0.858; RMSEA = 0.042; $\chi_2 = 1355.958$; df = 788; chi-square ratio = 1.72

stress levels for internal audit professionals. However, higher skill variety was significantly related to higher (rather than lower) role stress across all three stress dimensions. Expanded responsibilities may open new areas of stress for internal auditors. Hypothesis 3 should be partially accepted and partially rejected.

## 5. Discussion

Rather than accept the demands for professional status often proposed in the practitioner literature, this paper has investigated the structure of beliefs held by internal auditors. This involved an assessment of internal auditors against a general model of professionalism. Further, this study investigated the relationships among job characteristics, role stressors, and professionalism.

Three of the five job characteristics studied in this research are associated with internal auditor professionalism. Consistent with the concept of independence, the hallmark of auditors, most pronounced is the effect of job autonomy. Increased autonomy is highly associated with professional attitudes related to the control of the auditors' work within the organisation (autonomy demands), across organisations (belief in self-regulation), and engagement in the activities of the profession and other professionals (community affiliation). Feedback from others seems to encourage affiliation with the profession (community affiliation) and its regulation (belief in self-regulation). Those auditors who believe in the significance of their work were more enthusiastic about their profession (dedication) and the contribution of their efforts to the broader objectives of internal auditing (social responsibility). These effects indicate that the actual work done is not at odds with more macro-level attitudes and orientations.

The role stressors variables demonstrated only selective effects on internal auditor professionalism. In general, the results do not support a belief that role stressors deter the development of professionalism. In fact, experienced role conflict leads to stronger attitudinal and behavioural professional consequences. Internal auditors with higher levels of role conflict believe in higher levels of autonomy of their work and seek out professionals to support them. However, the lack of clarity in role expectations does have a negative consequence. Internal auditors reporting high role ambiguity tend to be less dedicated to their profession. Lacking specified knowledge about how to perform well erodes the desire to do so.

The absence of any relevance from the role overload variable was somewhat surprising. The work loads for this occupational group may be within reasonable ranges so that professionalism dimensions are not affected. Alternatively, internal auditors may be effectively coping with the high demands of their responsibilities. Since internal auditors do not have specific operational responsibilities, they may also have more flexibility to adjust their work loads on an ongoing basis.

### *5.1. Implications and limitations of the results*

These research results indicate the futility of statements that do not address the detail of the dimension indicated by this analysis. For example, broad statements about internal auditor 'professionalism' disguise the unique correlates for distinctly different elements of that construct. Likewise, 'role stress' and 'job characteristics' tend to be poorly differentiated aggregates in the absence of more specific analysis.

The results have clear action directives for organisations concerned with the inculcation of internal auditor professionalism. Providing internal auditors with autonomy to perform their work and related feedback about job performance are perhaps the most important parts of what organisations can do. Autonomy and feedback have the most pervasive direct and indirect influence upon professionalism. A more general attempt to enrich the jobs of internal auditors also will have some rewards in terms of increasing professional attitudes. Firms should be attentive to the level of clarity of expectations that internal auditors face. However, organisations should also be aware that internal auditing inherently involves role conflict. Efforts to eliminate role conflict may deny internal auditors the very essence of their roles in the organisations.

The focus on the interpersonal level of analysis for the antecedents of professionalism can be seen as complementry to the vigorous attention that has been given to the organisational level design of the internal audit function. Perhaps the largest change that has occurred in the last 20 years in this area involves creating a greater organisational autonomy for internal auditing, primarily by altering the level to which internal auditing reports (IIA, Section 110, 1978). While these changes make internal auditing more credible to policy makers, external auditors, and would-be regulators (see, e.g., COSO, 1992, Cadbury Committee, 1992, 1994; AICPA, SAS 65, 1991; Treadway Commission, 1987), they are only valuable if they spawn the network of beliefs and attitudes traditionally associated with professionalism within internal auditing. Now that most larger organisations have adopted the recommended organisational structures (see Schiff, 1991), attention should be turned to the interpersonal levels where audits are organised and performed.

Interpersonal conditions, such as those subsumed by role stress and generic job characteristics, may not be as important to other professions as they are to internal auditors. Occupational endeavours more steeped in formal education and ideal types popularised in the media may involve more *a priori* professionalism. This vacuum tends to be filled by organisational conditions, such as role stress and job design.

A potential limitation of this research is the level of achieved measurement reliability and validity and the structured model fit. Although reliability measures for individual constructs and fit measures for the model were generally good, some measures are somewhat lower than desirable. Supplementary analysis of the model that eliminated the two measures with the lowest reliability provides support for the robustness of results. However, further empirical work to substantiate the relationships found in this research would be useful.

The present research does not reach the issue of how internal auditor professionalism changes over time and is either nurtured or suppressed by the organisation. By relating professionalism to role expectations and the generic feature of work design, this research indicates that changes in the organisation may lead to changes in individual attitudes.

The treatment of internal auditor professionalism in this paper provides another perspective on the recent controversial trend toward the outsourcing of the internal auditing function to external auditors (see, for example, Cheney, 1996; Verschoor, 1996; Barr, 1995; Hodgson and Puschaver, 1995). Role-based and work-based conditions for auditors may differ between those employed by the organisation and those employed by others, even when the work and objectives may be similar. Further, the notion of professionalism and professional allegiance for such auditors may necessarily be less delineated.

Future research should endeavour to separate the relative contributions of the sets of attributes considered in this research. For these purposes, it may be useful to concentrate upon the specific elements of the job characteristics model and of role stress found more important by this exploratory attempt. This may also facilitate the superior contextualising of professionalism with a larger set of behavioural outcomes such as turnover, satisfaction, and commitment. Such an approach will shed light on the rewards of professional attitudes for the individual and the organisation.

## References

Abbott, A. (1988). *The System of Professions*. Chicago: University of Chicago Press.

American Institute of Certified Public Accountants (1991). *Statement on Auditing Standards No. 65: The Auditor's Consideration of Internal Audit Function in an Audit of Financial Statements*. New York: AICPA.

Arbuckle, J. (1997). *Amos Users' Guide Version 3.6*. Chicago: Small Waters Corporation.

Armstrong, P. (1985). 'Changing management control strategies: the role of competition between accounting and other organized professions'. *Accounting, Organizations and Society*, 129–147.

Bamber, E., Snowball, D. and Tubbs, R. (1989). 'Audit structure and its relation to role conflict and role ambiguity: an empirical investigation'. *The Accounting Review*, 64 (2): 285–299.

Barber, B. (1963). 'Some problems in the sociology of professions'. *Daedalus*, 21–45.

Barr, S. (1995). 'Farming out internal audits'. *CFO* (June): 69–72.

Bartol, K. (1979). 'Professionalism as a predictor of organizational commitment, role stress and turnover: a multi-dimensional approach'. *Academy of Management Journal*, 815–821.

Beckman, S. (1990). 'Professionalization: borderline authority and autonomy in work', in Burrage, M. and Torstendahl, R. (eds.). *Professions in Theory and History*, 115–138. London: Sage.

Bentler, P. and Bonett, D. (1980) 'Significance tests and goodness of fit in the analysis of covariance structures'. *Psychological Bulletin*, 88: 588–606.

Bishop, J. (1977). 'Organizational influences on the work orientations of work and occupations'. *Sociology of Work and Occupations*, 171–208.

Browne, M. and Cudeck, R. (1993). 'Alternative ways of assessing model fit', in Bollen, K. and Long, J. (eds.). *Testing Structural Equation Models*, 136–162. London: Sage.

Bullard, J. and Snizek, W. (1986). 'Professionals' attitude toward advertising: a study of accountants, dentists and lawyers'. *Sociological Spectrum*, 6: 307–318.

Burrage, M., Tarausch, K. and Siegrist, H. (1990). 'An actor-based framework for the study of the professions', in Burrage, M. and Torstendahl, R. (eds.), *Professions in Theory and History*, 203–215. London: Sage.

Cadbury Committee (1992). *Report of the Committee on the Financial Aspects of Corporate Governance*.

Cadbury Committee (1994). *Internal Control and Financial Reporting*.

Chambers, A., Selim, G. and Vinten, G. (1987). *Internal Auditing*, 2nd ed. Chicago: Commerce Clearing House, Inc.

Chambers, A. (1995). 'Whistleblowing and the internal auditor'. *Business Ethics*, 4, 4 (October): 192–198.

Cheney, G. (1996). 'Internal auditors push AICPA on outsourcing ethics'. *Accounting Today*, May 20–June 2: 14, 49.

Cogan, M. (1955). 'Problems in defining a profession'. *Annals of the American Association of Political and Social Sciences*, 705–711.

Collins, K. and Killough, L. (1992). 'An empirical examination of stress in public accounting'. *Accounting, Organizations and Society*, 17, 6 (August): 535–548.

Committee of Sponsoring Organizations of the Treadway Commission (COSO). (1992). *Internal Control-Integrated Framework*.

Corwin, R. (1961). 'The professional employee: a study of conflict in nursing roles'. *American Journal of Sociology*, 604–615.

Cullen, J. (1978). *The Structure of Professionalism*. New York: Petrocelli Books.

Cummings, L. (1982). 'Organizational behaviour'. *Annual Review of Psychology*, 33: 541–579.

Dunham, R. (1977). 'Reactions to job characteristics: moderating effects of the organization'. *Academy of Management Journal*, 20: 42–65.

Dyckman, T. (1974). 'Public accounting: guild or profession'? in Sterling, R. (ed.). *Institutional Issues in Public Accounting*, 189–210. New York: Scholars Books.

Evans, M., Kiggundo, M. and House, R. (1979). 'A partial test and extension of the job characteristics model of motivation'. *Organizational Behaviour and Human Performance*, 24: 354–381.

Fisher, C. and Gitelson, R. (1983). 'A meta-analysis of the correlates of role conflict and ambiguity'. *Journal of Applied Psychology*, 68: 320–333.

Foster, S. and Greenawalt, M. (1995). 'Internal auditing education: a comparison across countries'. *Managerial Auditing Journal*, 10 (3): 31–36.

Fox, R. (1957). 'Training for uncertainty', in Merton, R. (ed.), *The Student Physician*, 205–219. Cambridge: Harvard University Press.

Freidson, E. (1986). *Professional Powers: A Study of the Institutionalization of Formal Knowledge*. Chicago: University of Chicago Press.

Fried, Y. and Farris, G. (1987). 'The validity of the job characteristics model: a review and meta-analysis'. *Personal Psychology*, 40: 287–317.

Fry, L. and Hellriegal, D. (1987). 'The role and expectancy participation model: an empirical assessment and extension'. *Journal of Organizational Behavior*, 295–309.

Gerbing, D. and Anderson, J. (1993). 'Monte Carlo evaluations of goodness-of-fit indices for structural equation models', in Bollen, K. and Long, J. (eds.), *Testing Structural Equation Models*, 40–65. London: Sage Publications.

Goldberg, A. (1976). 'The relevance of cosmopolitan/local orientations to professional values and behaviors'. *Sociology of Work and Occupations*, 331–342.

Goode, W. (1957). 'Community within a community: the professions'. *American Sociological Review*, 22: 194–200.

Gouldner, A. (1957). 'Cosmopolitans and locals: toward an analysis of latent social roles'. *Administrative Science Quarterly*, 281–306.

Gregson, T. (1992). 'An investigation of the causal ordering of job satisfaction and organizational commitment in turnover models in accounting'. *Behavioral Research in Accounting*, 4: 80–95.

Griffin, R. (1982). *Task Design: An Integrative Approach*. Glenview, Illinois: Scott Foresman & Co.

Hackman, J. and Lawler, E. (1971). 'Employee reactions to job characteristics'. *Journal of Applied Psychology*, 55: 259–286.

Hackman, J., and Oldham, G. (1975). 'Development of the job diagnostic survey'. *Journal of Applied Psychology*, 159–170.

Hall, R. (1968). 'Professionalization and bureaucratization'. *American Sociological Review*, 33: 92–104.

Hayduk, L. (1987). *Structural Equation Modeling with LISREL: Essentials and Advances.* Baltimore: Johns Hopkins Press.

Hodgson, D. and Puschaver, L. (1995). 'Sourcing internal audit services: a threat or a best practice?' *The CPA Journal*, December: 60–62.

Hopper, T. (1980). 'Role conflicts of management accountants and their position within organizational structure'. *Accounting, Organizations and Society*, 5: 401–412.

Hughes, M., Price, R. and Marrs, D. (1986). 'Linking theory construction and theory testing: models with multiple indicators of latent variables'. *Academy of Management Review*, 11: 128–144.

Institute of Internal Auditors (1978). *Standards for the Professional Practice of Internal Auditing*. Institute of Internal Auditors, Inc. Altamonte Springs, Florida.

Johnson, T. (1977). 'The professions in the class structure', in *Industrial Society: Class Cleavage and Control*, Scase, R. (ed.). New York: St. Martins Press.

Jõreskog, K. (1978). 'Structural analysis of covariance and correlation matrices'. *Psychometrika*, 443–477.

Jõreskog, K. and Sõrbum, D. (1989). *LISREL 7*, Scientific Software.

Kahn, R., Wolfe, D., Quinn, R., Snoek, J. and Rosenthal, R. (1964). *Organizational Stress: Studies in Role Conflict and Ambiguity*. New York: J. Wiley.

Kalbers, L. and Fogarty, T. (1995). 'Professionalism and its consequences: a study of internal auditors'. *Auditing: A Journal of Practice Theory*, 14, 1 (Spring): 64–86.

Kasel, J. and Deyoub. (1983). 'Internal auditor burnout'. *Internal Auditor*, October: 22–25.

Katz, D. and Kahn, R. (1966). *The Social Psychology of Organizations*. New York: J. Wiley.

Kelloway, E. and Barling, J. (1990). 'Item content versus item wording'. *Journal of Applied Psychology*, 738–742.

Kuveri, H. and Speed, T. (1982). 'Structural analysis of multivariate data', in Lernhardt, S. (ed.), *Sociological Methodology*. San Francisco: Jossey Bass.

Lambert, R. and Larcker, D. (1987). 'An analysis of the use of accounting and market measures of performance in executive compensation contracts'. *Journal of Accounting Research*, 25 (supplement): 85–129.

Lanen, W. and Larcker, D. (1992). 'Executive compensation contract adoption in the electric utility industry'. *Journal of Accounting Research*, 30, 1 (Spring): 70–93.

Loher, B., Noe, R., Moeller, N. and Fitzgerald, M. (1985). 'A meta-analysis of the relationship of job characteristics to job satisfaction'. *Journal of Applied Psychology*, 70: 280–289.

Lortie, D. (1975). *Schoolteacher: A Sociological Study*. Chicago: Nelson Hall.

McGee, G., Ferguson, D. and Seers, A. (1989). 'Role conflict and role ambiguity: do the scales measure these two constructs?'. *Journal of Applied Psychology*, 815–818.

Meiksins, P. and Watson, J. (1989). 'Professional autonomy and organizational constraint: the case of engineers'. *Sociological Quarterly*, 561–588.

Miller, D., Droge, J. and Toulouse, J. (1988). 'Strategic process and content as mediators between organizational context and structure'. *Academy of Management Journal*, 544–565.

Moch, M., Bartunek, J. and Brass, D. (1979). 'Structure, task characteristics, and experienced role stress in organizations employing complex technology'. *Organizational Behavior and Human Performance*, 24: 258–268.

Montagna, P. (1974). *Certified Public Accounting: A Sociological View of a Profession in Charge*. New York: Scholars Book Co.

Morrow, P. and Goetz, J. (1988). 'Professionalism as a form of work commitment'. *Journal of Vocational Behavior*, 92–111.

Netemeyer, R., Johnson, M. and Burton, S. (1990). 'Analysis of role conflict and role ambiguity in a structural equations framework'. *Journal of Applied Psychology*, 148–157.

Oldham, G. and Hackman, J. (1980). 'Work design in the organizational context', in Straw, B. (ed.). *Research in Organizational Behavior*, 247–278. JAI Press.

Oliver, R. and Brief, A. (1977). 'Determinants and consequences of role conflict and ambiguity among retail sales managers'. *Journal of Retailing*, 53: 47–58.

Oppenheim, A. (1966). *Questionnaire Design and Measurement*. New York: Basic Books.

Paton, W. (1971). 'Earmarks of a profession and the APB'. *Journal of Accountancy*, 37–45.

Pei, B. and Davis, F. (1989). 'The impact of organizational structure on internal auditor organizational-professional conflict and role stress: an exploration of linkages'. *Auditing: A Journal of Practice and Theory*, 101–115.

Pierce, J., McTavish, D. and Knudsen, K. (1986). 'The measurement of job characteristics: a content and contextual analytic look at scale validity'. *Journal of Occupational Behavior*, 7: 299–313.

Regoli, R. and Poole, E. (1980). 'Police professionalism and role conflict: a comparison of rural and urban departments'. *Human Relations*, 241–255.

Ritzer, G. (1973). 'Professionalism and the individual', in Freidman, E. (ed.). *The Professions and Their Prospects*, 59–73. Beverly Hills: Sage.

Rizzo, J., House, J. and Lirtzman, S. (1970). 'Role conflict and ambiguity in complex organizations'. *Administrative Science Quarterly*, 15: 150–163.

Sawyer, L. (1991). 'Internal auditing: practice and professionalism'. *Internal Auditor*, (June): 38–42.

Schiff, J. (1991). 'The current status of selected reporting relationships of chief internal auditors'. *Ohio Accountant*, 6.

Schuler, R. (1977). 'Role conflict and ambiguity as a function of the task-structure-technology interaction'. *Organization Behavior and Human Performance*, 20: 66–74.

Schuler, R. and Jackson, S. (1985). 'A meta-analysis and conceptual critique of research on role ambiguity and role conflict in work settings'. *Organizational Behavior and Human Performance*, 36: 16–78.

Senatra, P. (1980). 'Role conflict, role ambiguity and organizational climate in a public accounting firm'. *The Accounting Review*, 594–603.

Singh, J. (1998). 'Striking a balance in boundary-spanning positions: an investigation of some unconventional influences of role stressors and job characteristics on job outcomes of salespeople'. *Journal of Marketing*: 69–86.

Snizek, W. (1972). 'Hall's professionalism scale: an empirical reassessment'. *American Sociological Review*, 109–114.

Solomon, E. (1986). 'Motivating and stressful properties of jobs: integration of research approaches through facet analysis'. *Multivariate Behavioral Research*, 21: 333–356.

Strawser, R., Kelly, P. and Hise, R. (1982). 'What causes stress for management accountants'. *Management Accounting*, (March): 32–37.

Toren, N. (1975). 'Deprofessionalization and its sources'. *Sociology of Work and Occupations*, 323–337.

Treadway Commission (1987). *Report of the National Commission on Fraudulent Financial Reporting*. October.

van Sell, M., Brief, A. and Schuler, R. (1981). 'Role conflict and role ambiguity: integration of the literature and directions for future research'. *Human Relations*, 43–71.

Verschoor, C. (1996). 'Is the proposed AICPA ethics interpretation unethical?' *Accounting Today*, May 20–June 2: 14, 18.

Wade, L. (1967). 'Professionals in organizations: a neoteric model'. *Human Organization*, 26: 40–46.

Williams, L. and Hazer, J. (1986). 'Antecedents and consequences of satisfaction and commitment in turnover models: a reanalysis using latent variable structural equations methods'. *Journal of Applied Psychology*, 219–231.

Wilson, A. and Wood, D. (1988). 'The auditors speak: an empirical study of behavioral auditing'. Unpublished manuscript.

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# Just-in-time manufacturing, management accounting systems and profitability

**Lokman Mia***

**Abstract**—Managers working in just-in-time manufacturing environments have little or no slack resources available to them to cushion against the difficulties caused by defective raw materials, production errors, irregular supply and demand schedules or to mask inefficiencies (Griffin and Harrell, 1991). This makes the performance-related information provided by management accounting systems critical in such environments. This paper reports the results of a study that empirically tested the above statement. It was done by evaluating the impact of adoption of just-in-time manufacturing (JIT) and the information provided by the management accounting system on organisational performance (profitability). Data for the study were collected through personal interviews with financial controllers of 55 organisations located in Australia. Of these organisations, 28 adopted JIT at least three years prior to the study and the rest were non-adopters at the time of the study. The results suggest that the JIT adopter organisations with high (low) provision of the information earn high (low) profit. The study supports the argument that adoption of JIT and provision of the information together can assist an organisation in improving its profitability.

## 1. Introduction

The literature provides an array of alternative definitions for just-in-time manufacturing (JIT), and in many cases these definitions are confusing. After reviewing the literature, Cowton and Vail (1994, p. 427), for example, conclude: 'It has been widely explained and discussed, yet there still persists confusion over its definition and a surprising diversity in the practices which go under its name'. For the purposes of this study, JIT is viewed as a system under which the goods in one stage of the production-sales cycle are completed just prior to being needed at the next stage; it focuses on the minimisation of activities or use of resources which do not add value to products (Gordon, 1997).

As implementation of JIT minimises slack resources,[1] managers operating in JIT environments do not have a buffer against the difficulties caused by defective raw materials, production errors, irregular supply and demand schedules, and consequently they are unable to mask inefficiencies (Daniel and Reitsperger, 1991; Gordon, 1997). Selto et al., (1995) argue that tasks in JIT environments are highly interdependent; each succeeding task depends on quality and the timely completion of the preceding task. The high task interdependencies require managers to detect and correct process problems and product defects on the spot and take measures to prevent such problems and defects to keep production flowing. In other words, JIT environments require that managers be able to manage themselves, which means they have greater authority and responsibility compared to their counterparts in JIT non-adopter organisations.

Anderson et al. (1989) and Kaplan and Atkinson (1989) suggest that management accounting systems (MAS) play important roles in an organisation. One such role is the provision of information on target (budget) and actual performance for evaluation of actual performance against the target.[2]

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[1] Slack resources may be defined in terms of overstated requirements (Schiff and Lewin, 1970; Young, 1985). For this study, slack resources represent an amount in excess of the amount required for efficient operation. For example, if an organisation can operate effectively by maintaining stocks equivalent to two weeks' sales of a product but maintain three weeks' stock, then the one week's extra stock represents the amount of slack resources.

[2] The target or budget and actual performance can be expressed both in non-financial and financial terms. Indeed, a performance budget such as a sales budget is usually expressed

The relatively high authority and responsibility for managers working in JIT environments make the information provided by the MAS (henceforth, the MAS information) more useful for managers seeking to operate effectively (see Gordon and Narayanan, 1984). Chenhall and Morris (1986) report a positive association between task interdependency and usefulness of MAS information. Following Chenhall and Morris (1986), it can be argued that MAS information may be more important in JIT environments, as task interdependency among work stations and functions in such environments is high (see Gordon, 1997). MAS (as a part of an organisation's overall control system) can facilitate coordination, control and communication by providing necessary information and thus help managers in managing operations well. It seems likely, then, that MAS information in JIT adopter organisations may be critical for the smooth running of operations, resulting in the achievement of organisational objectives such as profitability. However, a literature review indicates that there is a lack of research investigating the relationship between provision of MAS information and organisational profitability taking into account the adoption of JIT. Selto et al. (1995), for example, argue that there has been a lack of attention to controls (including communication and information flow) and other organisational aspects under JIT. Consequently, our understanding of the importance of MAS information in JIT environments is limited. This study attempts to address this issue.

For the purposes of this study, MAS was viewed broadly in that the traditional function of the system, which is to provide quantitative and financial information, has now expanded to include information relevant for innovations in production, marketing and organisational design. Today's MAS provides information on extra-organisational variables as well as operating data (Ansari, 1997; Bromwich and Bhimani, 1994; Gordon, 1997). The operating data includes information for suppliers on periodic demands for parts, delivery time, and quality; for production cells, on actual results to allow for corrective action and learning; and for production cells and design engineers, on how their actions influence costs and performance in other organisational areas (see Ansari, 1997).

The recent development in management accounting systems, which led to the introduction of a 'balanced scorecard approach' to performance measure, makes management accounting information even broader. This is because the approach incorporates qualitative, quantitative, financial and non-financial information on performance indicators including operating income, revenue growth, cost controls, defects, yield, manufacturing lead time, time to market, market share, customer response time, customer satisfaction, product reliability, quantity of defective products shipped to customers, and the ratio of good output to total output (Ansari, 1997; Kaplan and Norton, 1992, 1993, 1996). Most of the information can be classified as physical operational data. As a result of such development, there is little difference today between the information provided by MAS and that provided by MIS (management information systems).[3] Macintosh (1985, pp. 3–7), for example, concludes that the demarcation point between management accounting systems and management information systems has become blurred. Macintosh further argues that like the plumbing system for a house, management accountants provide the cold and hot water while the MIS people provide the pipes and plumbing. Macintosh's 'cold and hot water' may be interpreted as broad information incorporating financial as well as non-financial data and 'pipes and plumbing' as hardware and software. The current study viewed MAS information to be broad.

The paper is arranged into six sections. Section Two explains the importance and requirements of a JIT operation. Section Three explains how MAS information on performance in a JIT environment may promote organisational profitability. The research method is described in Section Four, followed by the presentation of the results in Section Five. Section Five also presents an explanation for the results, drawing on anecdotal information obtained during interviews with the financial controllers who participated in the study. The final section discusses the conclusions, limitations of the study and suggestions for future research..

## 2. Just-in-time manufacturing (JIT)

Intensified competition in the marketplace encourages firms to find a competitive edge in manufacturing. To survive in such competitive environments characterised by dynamic technology, an organisation needs to employ strategies consistent with its environmental demands for efficiency, effectiveness and customer responsiveness. The adoption of JIT is one such strategy (Ansari, 1997; Yasin et al., 1997; Sakakibara et al., 1993; and Green, 1991). Cobb (1993) reports that survival in the increasingly competitive market, meeting customer demands, staying ahead of competitors and

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in non-financial and financial terms, as the budget always includes the volume of sales in physical units and dollars.

[3] MIS collects and processes the data to produce the information that managers need to plan, control, and manage their organisations (Cushing and Romney, 1994, pp. 12–14). The information is broad in the sense that it includes qualitative, quantitative financial and non-financial data that covers issues which are internal as well as external to the organisation.

minimising slack resources are some of the benefits for which companies adopt JIT.

The literature suggests that a successful implementation of JIT results in a number of benefits in terms of improved flexibility, productivity, quality, lead-times, set-up times, customer responsiveness, and inventory holdings (see, Cowton and Vail, 1994; Currie, 1992, 1993). Green (1991) suggests that JIT has been too successful to ignore.

However, JIT is not problem-free, as indicated by the relevant literature. Golhar and Deshpande (1993), for example, report two major problems faced by JIT adopter firms: workers' resistance to learning new skills and increased friction between workers and management. In another study, Inman and Brandon (1992) found that JIT adoption contributes to high levels of stress among line operators, leading to low productivity, high absenteeism, poor decisions, and poor morale. This finding supports Ansari (1997), who argues that there is intense pressure in a JIT environment to support the team, search for improvement opportunities and perform at optimum levels at all times. This causes stress, employee burnout, and subsequently high employee turnover and high recruitment and training costs.

On the other hand, the literature also contains ample evidence on the benefits of JIT applications. Johansson (1990) suggests that organisations will continue to adopt JIT because it presents an enormous opportunity for improving their competitive position. Kaplan and Atkinson (1989) argue that successful adopters of JIT enjoy tremendous advantages as a result of direct and indirect financial savings. An example of the direct financial savings attributable to the implementation of JIT is the decrease in investment required to hold inventory. When inventory levels are reduced from say, four months to one month of sales, stock financing costs are reduced by 75%. Balakrishnan et al., (1996) suggest that JIT adoption is commonly associated with reduced inventory levels and increased inventory turns leading to increased profitability. Application of JIT also promotes indirect financial gains through cost savings from improved product quality, reduced wastage, better coordination and closer relationships with suppliers and customers (Cobb, 1993). By fostering closer relationships with suppliers, JIT minimises inventory of raw materials. Similarly, by creating high task interdependencies among work stations and encouraging closer relationships with customers, JIT minimises slack resources such as inventory of work in progress (parts) and finished products. The result is reduced product costs. Selto et al. (1995, p. 666) argue that because of the highly interdependent nature of tasks under JIT, production of excess parts or finished products is virtually nil or negligible (see also Balakrishnan et al., 1996).

In contrast, a traditional (non-JIT) manufacturing system is unable to function without slack resources. One reason for this is that the system follows a push approach to manufacturing (Schonberger, 1982, 1986) where parts and products are pushed through the process as quickly as possible. If parts are not used and products are not sold as quickly as they can be produced, inventory of parts and products builds up (Selto et al., 1995). The built up inventory locks up capital, and consequently, operating costs under the system become comparatively high (Daniel and Reitsperger, 1991).[4] Slack resources such as excess inventory are normally used not to improve efficiency but to mask inefficiencies or to handle unforeseen events faced by managers. This argument is supported by Griffin and Harrell (1991) who state that the availability of slack resources provides managers and supervisors with a cushion against the difficulties caused by defective raw materials, production errors and irregular supply and demand schedules. Thus, through implementation of JIT, organisations are able to minimise the level of slack resources, and thus reduce their operating costs and costs of capital.

In a competitive market, the reduction in costs and the resultant ability to sell products at a competitive price are effective strategies which organisations can use to gain an advantage over competitors. The synergy from the implementation of JIT and application of automation reduces wastage and production costs, enhances product quality, and promotes optimal utilisation of capacity leading to higher profitability (Anderson et al., 1989). This is not to deny that profitability of an organisation may be affected by other factors internal to the organisation such as management–employee relationship, and by factors external to the organisation. For example, changes in the exchange rate of an organisation's base country may affect the organisation's export trade and thereby its profit.

Proponents have argued that companies applying JIT can produce and distribute their products at lower costs without compromising quality and sell their products at competitive prices, and still make profits. Therefore, these companies can retain and even increase their market share, and improve profitability. For example, Kaplan and Atkinson (1989, p. 417) report:

> 'The enormous gains in productivity from successfully achieving JIT production led one electronics materials manager to claim that he expected to see two kinds of factories in

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[4] The high operating costs may result from the expenses incurred for holding inventories in excess of requirements and for non-value-added activities. Adoption of JIT minimises (if not eliminates) these costs.

> the 1990s: JIT manufacturing factories and closed factories'.

Bromwich (1990, p. 27), states that:

> 'Firms are being urged to utilise new systems of production, such as Just-In-Time manufacturing, which are often argued to be used far more intensively by sophisticated competitors in other countries'.

## 3. JIT and the information provided by the MAS

Managers working in JIT environments have a greater need for management accounting information on targets and actual performance. This is because in JIT environments, little or no slack resources are available to managers to cushion against the difficulties caused by defective raw materials, production errors, irregular supply and demand schedules, or to mask inefficiencies (Griffin and Harrell, 1991). As a result, continuous monitoring of actual performance is required for the operation of the production process under JIT (Kaplan and Atkinson, 1989; Hiromoto, 1988; Daniel and Reitsperger, 1992). MAS can provide managers with information that they need to monitor performance. The role of MAS in meeting managers' information requirements is consistent with the argument that the provision of information is a central component of an organisation's accounting and control system (Luckett and Eggleton, 1991; Ferris and Haskin, 1988).

The management accounting system (MAS) in an organisation can be expected to provide information on specific performance target (budget), and monitor the achievement of the target (Birnberg and Snodgrass, 1988; Goold and Quinn, 1990). A manufacturing organisation may set performance targets in terms of budgeted production volume, costs, wastage rates, levels of inventory, percentage of defects and capacity utilisations. Once the target is set, it is necessary to monitor actual performance towards achievement of the target and take appropriate action if necessary. Monitoring may include the comparison of actual performance with the target, performance trend analysis and benchmarking.[5]

This study argues that MAS information becomes more critical under JIT than under non-JIT situations. MAS information plays a more critical role under JIT environments because managers working in such environments are responsible for managing their own operations (Selto et al., 1995). Because of such responsibility, managers need MAS information on target and actual performance, thus they find the information to be more useful (see Gordon and Narayanan, 1984; Chenhall and Morris, 1986; and Kaplan and Atkinson, 1989). Another reason is that tasks in a JIT environment are highly interdependent in the sense that the execution of a succeeding task depends on completion of the preceding task (see Gordon, 1997). Previous literature suggests that the usefulness of MAS information and the level of task interdependency go hand in hand (Chenhall and Morris, 1986; Selto et al., 1995). Moreover, since slack resources in JIT environments are not available to cushion against process problems, MAS information on matters such as targets and actual performance is important in assisting managers to compare actual performance with target, and take corrective action.

In contrast, the traditional manufacturing system allows use of slack resources to offset unforeseen contingencies. For example, if a production process stops unexpectedly, customer orders under the traditional manufacturing system could still be supplied as the system provides for the maintenance of a certain quantity of finished product inventory. However, since JIT minimises the availability of such resources, supplying customer orders under this system would be difficult if the production process stops unexpectedly. Therefore, the provision of the information related to production process and performance under the traditional manufacturing system is less critical than under JIT (see Daniel and Reitsperger, 1991; Hayes and Garvin, 1982).

The above discussion suggests that the provision of MAS information is more critical for the effective operation of a production process in a JIT adopter organisation than in a non-adopter organisation. Therefore, it is argued that JIT adopter organisations with high (low) provision of the MAS information[6] would earn a high (low) profit.

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[5] The current study views performance trend analysis as comparing an organisation's current period performance with those of previous periods, and benchmarking as comparing the performance with an appropriate external variable, e.g., competitor or industry average.

[6] It may be noted here that adoption of JIT may make some management accounting information less important. For example, since a JIT adopter organisation usually maintains relatively small inventory, detailed information on inventory becomes less useful. Consequently, as Cobb (1993) reports, accounts for raw materials and work in process (WIP) inventory in many JIT adopter organisations are combined into one account called 'raw and in process (RIP)', and only summary information is provided. On the other hand, information relating to materials usage and cost appears to be as important (if not more important) in a JIT adopter organisation as it is in a non-adopter. Cobb (1993) reports that all but one of the 10 JIT adopter companies which participated in the study use materials, labour, and overhead related information. Examples of the information are standard and actual costs, purchase price variances, usage variances, bill of materials and variances, labour costs and variances, and overhead costs and variances. Green et al. (1991, p. 51) report that Hewlett-Packard, a leading JIT producer, continues to use standard material cost, and cost effectiveness measured in terms of total quality control,

The null hypothesis below summarises the discussion.

> There is no interaction between JIT adoption and provision of MAS information affecting profit. $H_1$

## 4. Research method

### *4.1. Sample selection*

Using Dunn and Bradstreet 'Salescan' database, 150 companies within large publicly listed Australian manufacturing organisations were selected for the study. Only large organisations (with annual sales revenue of A$300m to A$700m) were selected so that they were comparable in size. Only manufacturing organisations were selected because the just-in-time approach has been more commonly applied in manufacturing industries to date.

The data collection for the study was completed in two stages. In the first stage, a questionnaire was sent to the financial controllers of the 150 selected companies. To obtain a high response rate, the questionnaire asked the financial controllers to read two short statements and answer two questions following the statements (see Appendix A). The purpose of the first question was to identify JIT adopter and non-adopter firms and the second question to include, in the sample, firms (companies) with at least three years' experience (explained below) in JIT applications. Another consideration for using the three year period as the cut-off point for including JIT adopter companies in the sample was that the period was considered to be long enough for a company to evaluate its application of JIT and drop the system if required.

Financial controllers were targeted because they were considered to be the most knowledgeable individuals in each company to answer the two questions. Financial controllers were likely to be closely involved in the adoption, implementation and monitoring of JIT operation in their organisations.

The questionnaire also asked the financial controllers to indicate if the accounting systems in their organisations were computerised and on line.[7] This question was asked to ensure that each company included in the sample had a computerised accounting system which could provide MAS information on targets and actual performance. Having a computerised and online accounting system facilitates provision of the necessary information to managers. Since all the companies in the study had their accounting system computerised, the impact of a computerised accounting system on the provision of information was controlled. As discussed later in the section, computerisation of accounting systems and the provision of MAS information were investigated further during the interviews with the financial controllers.

The questionnaire was attached to a letter explaining the purpose of the study and assuring respondents of the confidentiality of the information. A self-addressed, postage-paid envelope was attached for returning the completed questionnaire directly to the researcher. Of the 150 questionnaires sent, 115 were completed and returned. The information collected in the first stage indicated that 65 of the 115 companies had adopted JIT. A scrutiny of these 65 companies revealed that 18 had adopted JIT less than three years prior to the study. Since a period of at least three years was considered necessary for JIT to have an impact on a company's operation, these 18 companies were excluded from the sample, leaving 47 companies in the JIT adopter groups and 50 in the non-adopter group.

The financial controller of each of the 97 companies was requested to participate in the study and 55 of them agreed to do so. On average, the controllers had worked in their present company for 10.9 years and held their present position for 4.7 years. These 55 companies operated in the following manufacturing industries in Australia: building products, home appliance, electronics, chemical, pharmaceutical, food, beverage, rubber and automobile. Of the 55 companies, 28 were JIT adopters and 27 were non-adopters. The detailed sample is presented in Table 1, which reveals that the sample was not dominated by any particular industry.

The final stage of the data collection was personal interviews with the financial controller of each of the 55 companies over a period of 10 months. A structured questionnaire approach was used for the interviews, which lasted from one hour to two and a half hours. The personal interview method was chosen (a) to answer any financial controller's queries while completing the questionnaire, and (b) to obtain explanations from the controllers for any non-recurring transaction which might have affected the profitability of their company (this issue is further discussed under profitability measure below). Moreover, having personal interviews with the controllers gave the researcher the opportunity to acquire a more intimate knowledge of the type of improvements required in accounting systems to meet information demands, particularly in a JIT environment. For example, the financial controller of a building products company, which had adopted JIT, said:

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reduction of inventory, cooperation with vendors, on-time deliveries, and process cost reduction. Green et al. also report that another company in the study, Warner, was found to concentrate on the difference between budgeted production and actual production, seeking continual improvements.

[7] Although today's large organisations are expected to have computerised accounting systems, the third question in Appendix A was asked to double check.

**Table 1**
**Description of the sample**

| *Industries* | *JIT adopters* | *JIT non-adopters* | *Total* |
|---|---|---|---|
| Building products | 3 | 4 | 7 |
| Home appliances | 2 | 3 | 5 |
| Electronics | 4 | 3 | 7 |
| Chemical | 1 | 2 | 3 |
| Pharmaceutical | 2 | 3 | 5 |
| Food | 5 | 4 | 9 |
| Beverage | 4 | 3 | 7 |
| Rubber | 4 | 3 | 7 |
| Automobile | 3 | 2 | 5 |
| Total | 28 | 27 | 55 |

> 'Our company introduced JIT five years ago. At the beginning, things were a bit rough; machinery not set up properly, contracts with the suppliers and customers not worked out, information system not suitable for the new manufacturing system, I mean, JIT. So we struggled for about three years during which we modified the production processes, overhauled the accounting system with new computers and packages suitable for our needs under JIT, and trained personnel. Since last year, we are getting the benefits. Last year our profit increased by 20% over the previous year and we hope this year it will be at least 20% higher than last year.'

In an attempt to confirm adoption of JIT by the 28 companies in the adopter group, the controllers of these firms during the interviews were requested to name the most important effect (in their opinion) that the introduction of JIT had on their company's operations. Twenty-one of these controllers named 'reduction in inventory' of raw materials and finished products as the most significant effect of adopting JIT. The financial controller of a food-processing firm said:

> 'Through adoption of JIT we have drastically reduced raw materials inventory. Luckily our raw materials are locally supplied and we have been able to negotiate a schedule of delivery with the suppliers. It was far more difficult to negotiate with the customers, particularly the overseas ones, a schedule of deliveries of our finished products. Most of our overseas customers wanted relatively big but less frequent shipments. At the end we reached a compromise with them, which works reasonably well for us.'

In the cases of the other seven companies, the controllers mentioned 'flexibility in the manufacturing process' as the most important effect of JIT adoption. These companies upgraded their production processes to produce to order with minimum throughput time and set-up costs. A common phenomenon of these seven companies, as revealed by the controllers' comments, is the policy of timely supply of orders and holding a nil or negligible amount of finished goods stock.

To confirm that the companies had computerised and online accounting systems, each controller was requested at the end of the interview to ask a subordinate to call up on their computer screen information relating to last year's targets on the company's sales, departmental production budgets and a sample report on performance relating to the budget. Of the 55 controllers, 50 complied with this request; in the other five cases, time ran out. The display indicated that each of the 50 companies had a computerised and online accounting system providing the above-mentioned information.

### *4.2. Measures of variables in the study*

#### *4.2.1. Profitability*

Each company's[8] return on investment (ROI) in the previous year was used as the measure of its profitability. For the current study, ROI was defined as earnings before interest and tax over total assets (Martin, 1994). The relevant data were extracted from the company's financial statements for the previous year. In order to avoid the impact on ROI of any non-recurring transaction such as the sale of assets, the financial statements of each company were scrutinised. This was done for the year immediately prior to the study. If the presence of any such transaction was identified, it was discussed with the financial controller of the relevant company during the interviews and the ROI was

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[8] For the purposes of this study, a company was a business unit operating as a profit centre and carrying out the usual business activities including manufacturing and selling products. The return on investment (ROI) for each company was calculated using the profits and assets as presented in the company's profit and loss statement and the balance sheet.

**Table 2**
**Descriptive statistics for the variables in the study***

*(Part A: the total sample)*

| | | | *Actual* | | *Theoretical* | |
|---|---|---|---|---|---|---|
| *Variables* | *Mean* | *Std. Dev.* | *Min* | *Max* | *Min* | *Max* |
| Provision of MAS information | 3.47 | 1.20 | 1.50 | 7.00 | 1 | 7.00 |
| ROI | 6.98 | 8.27 | 0.00 | 30.00 | n.a. | n.a. |

*(Part B: sub-sample: the JIT adopter group)*

| | | | *Actual* | | *Theoretical* | |
|---|---|---|---|---|---|---|
| *Variables* | *Mean* | *Std. Dev.* | *Min* | *Max* | *Min* | *Max* |
| Provision of MAS information | 3.26 | 1.00 | 1.50 | 7.00 | 1 | 7.00 |
| ROI | 10.32 | 8.98 | 0.00 | 30.00 | n.a. | n.a. |

*(Part C: sub-sample: the JIT non-adopter group)*

| | | | *Actual* | | *Theoretical* | |
|---|---|---|---|---|---|---|
| *Variables* | *Mean* | *Std. Dev.* | *Min* | *Max* | *Min* | *Max* |
| Provision of MAS information | 3.69 | 1.40 | 1.50 | 7.00 | 1 | 7.00 |
| ROI | 3.52 | 5.80 | 0.00 | 20.00 | n.a. | n.a. |

*JIT: adopter (J = 1), and non-adopter (J = 0).

adjusted accordingly. The discussion resulted in a minor adjustment of the ROI for three companies. The interview also provided the opportunity to confirm with the controllers that the calculation of ROI was based on the operating income and assets of the Australian operations of their company, which was considered necessary for ROI comparability amongst the companies in the sample. Table 2 presents the mean, standard deviation and the actual range of ROI for the total sample and also for the sub-samples (i.e., JIT adopter and non-adopter organisations).

Although ROI as a measure of performance is subject to criticism, it remains a fundamental approach to measuring organisational profitability. Horngren and Foster (1991) suggest that ROI appeals conceptually because it blends all the major ingredients of profitability (revenue, costs, and investment) into a single number. Based on a literature survey, Swieringa and Weick (1987, p. 297) conclude that '...even though ROI is criticised, it continues to be used extensively. It is a major yardstick for measuring corporate progress and executive performance'. They further argue that ROI facilitates comparisons among organisations in evaluating corporate performance, and among divisions within a company in evaluating divisional performance.

### *4.2.2. Provision of MAS information*

This study was concerned with the provision of target and actual performance-related information by MAS in the sample companies. As discussed on pages 2 and 3 of the paper, MAS information in the study was viewed to be broad in the sense that the information incorporates both financial and non-financial data. The provision of the information in the study was assessed accordingly. Examples of the financial data include costs, profits, and sales revenue and those of the non-financial data are volume of production, wastage rates, defects, capacity utilisation, and market share. The four questions presented in Appendix B were adapted from Simons (1987) to assess the construct. While question one focuses on information relating to budgeted performance targets, questions two and three focus on information relating to actual performance. Question four is concerned with information on performance benchmarking. To be included in the questionnaire, the question had to satisfy two requirements. One, since the fundamental argument in the study is that the MAS information is more critical for the effective operation of the production process in a JIT adopter than in a non-JIT adopter company, the information sought had to have the potential to be useful to a manufacturing organisation irrespective

**Table 3***
**Reasons for adoption and non-adoption of JIT by the sample organisations**

| *Reasons for adoption* | *Reasons for non-adoption* |
|---|---|
| Economic benefit (28) | We are doing OK. (20) |
| To be seen as innovative (21) | Customers not keen in contract for regular delivery of finished goods (20) |
| Competitors have adopted (20) | Little control over supply of input (18) |
| Senior managers saw the benefits (20) | Large capital investment required (18) |
| Existing system needed overhaul (18) | Resistance from below (15) |
| Top management pushed (15) | Involved in other priority (10) |

*The numbers within parentheses indicate how many financial controllers mentioned the reason during interviews

**Table 4**
**Correlation matrix for the variables in the study**

*(Total sample)*

| | (I) | (J) | ROI |
|---|---|---|---|
| Provision of MAS information (I) | 1.000 | −0.175 | 0.232* |
| JIT (J) | | 1.000 | 0.415** |
| ROI | | | 1.000 |

The correlation between MAS information and ROI for:
JIT adopter group = 0.55**
JIT non-adopter group = 0.20
*Legend:* *$p < 0.05$; **$p < 0.01$

of its adoption or non-adoption of JIT. Two, the question selected had to be relevant to the day to day concerns of managers in charge of operations such as production and marketing.

During the personal interviews, the controllers were asked to respond to each of the four questions on a Likert scale ranging from 1 (very low) to 7 (very high). A controller's score for the amount of the information provided was the sum of the controller's score for each of the four questions in the questionnaire. A factor analysis of the measure in the study produced a single factor with eigenvalue greater than one indicating that the instrument was unidimensional. The factor loadings, eigenvalue and percentage of variance explained are presented in Appendix B. A reliability check of the measure in the study produced a Cronbach (1951) alpha of 0.65, which is satisfactory although relatively low (Nunnally, 1967). Table 2 presents the descriptive statistics for the provision of the MAS information for the total sample and also for the sub-samples.

At the end of the interview, the controllers were requested to call up sample information relating to the four items in the questionnaire. Fifty controllers complied with the request by asking one of their subordinates to call up the information on their screen.

### *4.2.3. Adoption and non-adoption of JIT*

The adoption and non-adoption of JIT by the sample organisations were assessed by the financial controllers' response to two short statements contained in Appendix A. Those organisations which were classified by their financial controllers as 'Firm A' on the statement were categorised as JIT adopters and those as 'Firm B' were categorised as JIT non-adopters.

In an attempt to ascertain the reasons for adoption and non-adoption of JIT by organisations in the sample, the issue was discussed with each of the financial controllers during the interviews. Table 3 presents a summary of the reasons mentioned by the controllers for adoption and for non-adoption of JIT. It can be observed from the table that an organisation's decision to adopt or not to adopt JIT is influenced by not a single, but a set of both financial and non-financial factors.

**Table 5**
**Test of the hypothesis**
**Results of regressing return on investment (ROI) against JIT application, provision of the MAS information and the interaction between JIT and MAS information**

| *Variables* | *Reg. Coeff. β* | *Std. Error of β* | *T Value* | *Signif. level P <* |
|---|---|---|---|---|
| Interaction term (IJ) | $\beta_4=4.74$ | 1.720 | 2.75 | 0.008 |
| MAS information (I) | $\beta_3=0.802$ | 0.924 | 0.68 | n.s. |
| JIT (J) | $\beta_2=-8.31$ | 6.106 | −1.361 | n.s. |
| Constant | $\beta_1=0.564$ | 3.645 | 0.155 | n.s. |

Adjusted $R^2=32.70\%$,
$F_{(3,51)}=9.74$, $P<0.0001$

**Table 6**
**Results of regressing return on investment (ROI) against JIT and provision of the MAS information (assessment of the main effects)**

| *Variables* | *Reg. Coeff. β* | *Std. Error of β* | *T Value* | *Signif. level P <* |
|---|---|---|---|---|
| MAS information (I) | $\beta_3=2.17$ | 0.83 | 2.62 | 0.01 |
| JIT (J) | $\beta_2=7.73$ | 1.97 | 3.92 | 0.0003 |
| Constant | $\beta_1=4.48$ | 3.35 | 1.34 | n.s. |

Adjusted $R^2=24.13\%$,
$F_{(2,52)}=9.59$, $P<0.0003$

## 5. Results

In order to verify if industry characteristics and company sizes affected ROI of the sample organisations, a test of the difference in the mean ROI for different industries and company sizes in the sample was carried out using ANOVA. The test did not produce a significant result, thereby indicating the lack of a systematic industry or size effect on the ROI[9] of the companies in the sample.

The bivariate correlations for the variables are presented in Table 4. It can be observed from the table that the correlation between the provision of the MAS information and JIT is not significant, thereby indicating that these variables are independent of each other. One interpretation of this result is that the adoption of a new manufacturing technology like JIT is not necessarily accompanied by the modernisation or improvement of existing management accounting systems (Selto et al., 1995).

### *5.1. Test of the hypothesis*

The hypothesis predicts that there is no interaction between JIT application and the provision of MAS information affecting return on investment (ROI). This hypothesis was tested using the regression equation below:

$$Y=\beta_1+\beta_2 I+\beta_3 J+\beta_4 IJ+e \qquad (1)$$

where:

Y = The return on investment (ROI)

I = Amount of the information provided by MAS (MAS information)

J = Just in time manufacturing, for adopters (J = 1) and for non-adopters (J = 0)

IJ = The interaction (I*J)

E = The error

Rejection of the hypothesis required that $\beta_4$ in equation (1) be both significant and greater than zero. The results presented in Table 5 show that $\beta_4$ is significant at the $p<0.008$ level. This supports rejection of the null implied in the hypothesis. The model explains almost 33% (adjusted $R^2=32.70$,

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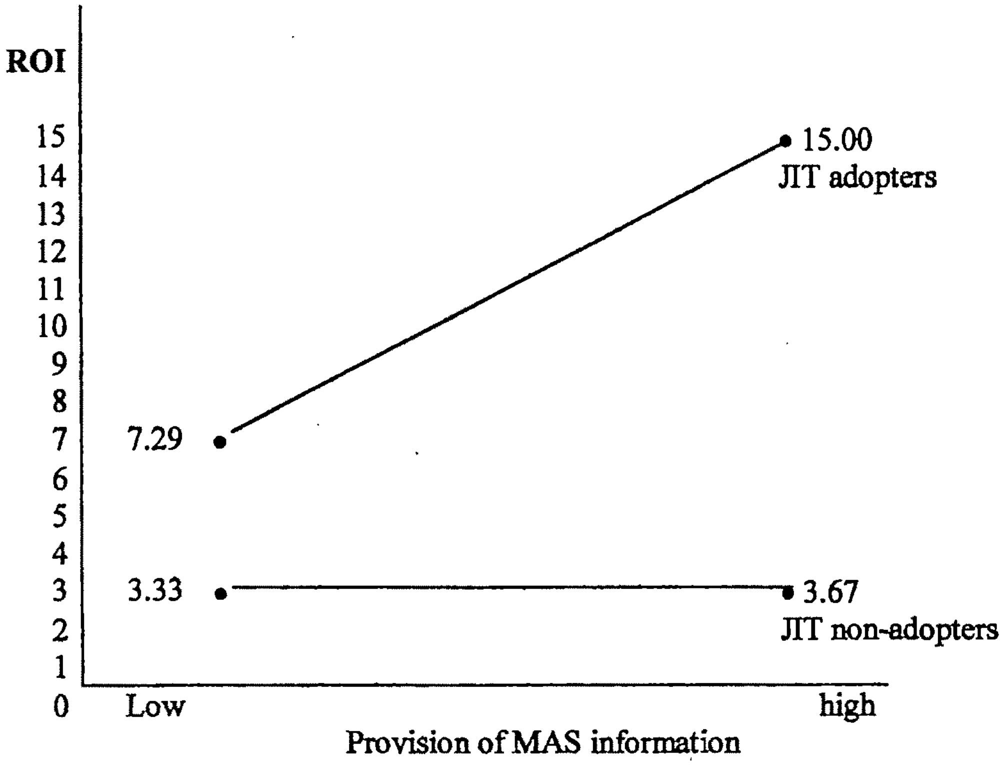
[9] A much more rigorous way of checking the industry and size effects is to include these variables in the hypothesis testing. The test was done by incorporating into the model the industry type, and company size as dummy variables. For this purpose, the companies in the sample were grouped by product characteristics such as building products, food and beverage, and by the number of employees as small, medum, and large. The results were similar to that of the ANOVA as the industry effects and size effects were not significant, yet the interaction term (I*J) remained significant.

**Table 7**
**Cell means of return on investment (ROI) with respect to provision of the MAS information and JIT**

| | | *MAS information* | |
|---|---|---|---|
| | | *Low (1)* | *High (2)* |
| JIT | Non-adopters (J=0) | #1<br>3.33<br>{12} | #2<br>3.67<br>{15} |
| | Adopters (J=1) | #3<br>7.29<br>{17} | #4<br>15.00<br>{11} |

*Numbers within {} represent the number of firms within each cell

**Figure 1**
**Provision of the MAS information and return on investment (ROI) in JIT adopter and non-adopter organisations**



$p < 0.0001$) of the variance in ROI. The regression results indicate that there is a significant interaction between the JIT application and provision of the MAS information affecting ROI.

As is the case in all regression studies not employing ratio scaled data, only the highest order interaction term is interpretable (Southwood, 1978). One way to overcome this problem is to run the model in equation (1) before introducing the interaction term. Following this procedure, the reduced model '$Y = \beta_1 + \beta_2 I + \beta_3 J + e$' was used to analyse the data. The results presented in Table 6 reveal that the coefficients within the reduced model that related to the amount of the information provided by the MAS and the application of JIT are both positive and significant at the $p < 0.01$ and $p < 0.0003$ respectively. The model explains 24% (adjusted $R^2 = 24.00$, $p < 0.0003$) of the variance in ROI.

A check of the cell means of ROI presented in Table 7 indicates that the JIT adopter firms which received a high amount of the MAS information earned a higher ROI compared to those JIT adopter firms which received a low amount of the MAS information. However, in the case of the JIT non-adopter firms, the high or low amount of the information provided by the MAS did not make a significant difference in the cell means. For the analysis, the MAS information was categorised as low for the amount provided below the mean and as high for the amount provided above the mean. These results graphically presented in Figure 1 offer a further support for the rejection of the null implied in the hypothesis.

The results (high ROI) in the case of JIT adopter companies are supported by the anecdotal information obtained during the interviews. For example, the financial controller in a food processing company, which adopted JIT, said:

> 'We spent a lot of time and effort in introducing the JIT system in our organisation. Initially, we had stiff opposition from the managers because they could not see what was wrong with the existing system. So we had to do a lot of selling. We have been using the system for over five years now. Initially, there were hiccups, which I believe were expected. For first couple of years, supporters of the new system including myself were under a lot of pressure, as the system did not produce the desired results. But the last two years have been fantastic. We have been able to reduce our finished goods inventory to only 15 days supply, raw materials inventory from seven weeks to only three weeks requirement. Our wastage rate is under constant monitoring. We know our cost, quality, and customer reaction.'

## 6. Discussion and conclusions

The results presented in Tables 5 and 6 reveal that as the provision of MAS information increases, the profitability of JIT adopter firms improves. An interpretation of the results is that the information in JIT adopter firms is more useful to managers in dealing with factors that affect their organisations' performance. Examples of these factors are product cost, wastage rates, inventory levels, defects, capacity utilisations and market share. The results indicate that while the information provided by MAS on performance may be useful for all organisations, as argued by previous researchers (see Hiromoto, 1988; Daniel and Reitsperger, 1992), the information is more useful under JIT situations. The greater usefulness of MAS information in the JIT adopter organisations is supported by the significant and positive correlation between the information and the ROI of these organisations (Table 4). As discussed in Section 3 of the paper, information on target and actual performance, and a comparison of actual performance internally over time and externally with industry average, is more critical for managers working under JIT environment.

These results support Bromwich (1990) and Babad and Balachandran (1993). Bromwich suggests that there is a need to release management accounting (in an organisation) from the factory floor to allow it also to aid the organisation directly in meeting challenges. Such a reorientation would permit management accounting systems to focus on the organisation's value-added activities. Babad and Balachandran argue that the relevant information provided by the cost management system (which is a part of MAS in an organisation) supports better management of corporate resources in the production of goods or in the provision of services, and improves competitiveness in terms of costs, quality and profitability. Based on the results of the study, it is argued that MAS, by providing information on performance (such as control of costs, quality and inventory level, and market share), effectively facilitates an organisation's competitiveness and profitability in a JIT situation.

The results of the study suggest that just-in-time manufacturing (JIT) adopter firms are more profitable than non-adopters. Therefore, this study supports Anderson et al. (1989) and Kaplan and Atkinson (1989), who argue the benefits of JIT adoption. The discussions during the interviews with the financial controllers on reasons for adoption or non-adoption of JIT by their firms suggest that economic benefit was the most common reason for JIT adoption. The summary of the reasons for JIT adoption as presented in Table 3 indicates that the financial controller of each of the 28 JIT adopter organisations in the sample mentioned economic benefit as one of the reasons for their firm's adoption of JIT. It implies that an organisation would not continue with applications of JIT unless benefits outweigh the costs, suggesting that the relatively high profit earned by the JIT adopter firms (see Table 7) is consistent with the firms' expectation. The cost-benefit considerations affecting an organisation's decision to, or not to, continue with the JIT application justifies the three year cut-off period for including a JIT adopter organisation in the sample. However, the financial controllers' comments as summarised in Table 3 revealed that social reasons (i.e., to be seen as innovative), herd effects (i.e., the competitors have adopted, so we have to) and senior managers' support are other important factors influencing the firms' decision to apply JIT operations. These findings on the reasons for JIT adoption and non-adoption are consistent with those of Cobb (1993) and Yasin et al., (1997).

In contrast, the financial controllers of 20 out of 27 non-adopter firms mentioned that 'we are doing OK' as a reason for non-adoption of JIT (see Table 3). An interpretation of this finding is that complacency about current performance may be a powerful factor influencing the firms' decision for non-adoption of JIT. Another plausible interpretation of the findings is that these firms had other priorities such as market penetration and new product introduction, and performance towards achievements of the priorities is satisfactory. Another important factor for non-adoption of JIT appears to be the difficulty in getting suppliers' and customers' agreement on a delivery schedule required for the operation. This finding is consistent with the view that a firm, to adopt JIT, needs to be in a relatively strong bargaining position in its market so that necessary arrangements can be made with its suppliers for supply of inputs and customers for delivery of outputs. Large capital investment necessary for adoption of JIT seems to be another important factor for non-adoption of JIT.

Given the results explained above, the current study extends Balakrishnan et al. (1996) in three ways. First, while Balakrishnan et al. (1996) suggest that customer concentration and cost structure influence a firm's decision to adopt JIT, this study suggests that there are other important factors as described above which may also affect the decision. Second, the current study identifies the factors which may influence a firm's decision to adopt JIT and also those factors which may inhibit the decision (see Table 3), but Balakrishnan et al. identify two factors which influence only the adoption decision. Third, Balakrishnan et al., (1996) do not assess the usefulness of information provided by an organisation's management accounting system either under JIT or non-JIT situations. The current study does (as explained above), by empirically investigating the relationship between provision of the MAS information and ROI under JIT and non-JIT situations.

This study adopts the objective measure for ROI, and thereby overcomes the problems of using self-assessment for the dependent variable (ROI) in the model. A common problem of studies on design and usefulness of MAS is self-assessments of dependent variables (see Selto et al., 1995). However, four caveats and related issues for future research need to be mentioned here.

First, this study adopted the narrow definition of JIT. Although the definition is consistent with the focus of the study, it is biased towards manufacturing activities and inventory management. There are other important aspects of JIT which are worth investigating. Examples of these aspects are employee resistance, employee turnover, recruitment and training needs, and impact of technological developments.

Second, this study categorised the sampled organisations into two groups: JIT adopters and non-adopters. Although adoption of JIT at least three years prior to this study was used as one of the criteria for selecting the organisations in the JIT adopter group, not all organisations might have implemented the system equally. In other words, there could be variations among the organisations in the adopter group with respect to the degree of JIT implementation. Consequently, the beneficial effect of the MAS information for different organisations within this group might have been different. But the study did not assess the variation in the degree of JIT implementation and the resulting effect on ROI. Moreover, one may argue that successful and profitable companies may decide to implement JIT, as such companies can afford the costs and risks involved. An investigation of this issue was beyond the scope of the current study. Future research would benefit from investigating the issue.

Third, only one aspect of organisational performance i.e., ROI, was considered in this study. In addition to the general limitations of ROI (Swieringa and Weick, 1987), the concept may suffer from some specific limitations in JIT situations. For example, at the initial stage (i.e., in the first year) of JIT adoption, ROI may decrease due to a decrease in profit or increase in cost of sales effect, whilst at the same time, the reduced denominator due to a decrease in stock may lead to increased ROI (Yasin et al., 1997). In other words, initially the effect of a company's adoption of JIT on its ROI may be neutral. However, this limitation of ROI does not affect the results of the study, as the sample companies adopted JIT at least three years prior to the study. Costs are also likely to increase due to staff resistance and difficulties in adapting existing, and for purchasing new, software (Cobb, 1993). These difficulties/problems may have varied effects on ROI in a JIT adopter organisation. Therefore, other aspects of organisational performance such as product innovation, customer satisfaction, customer response time, capacity utilisation and cost control could be investigated. Future research investigating this issue would be beneficial.

Fourth, while considerable care was taken in selecting the sample, participation of the subjects (financial controllers) in the study was voluntary. Thus, there is a potential of self-selection (response) bias in the sample. For example, it is plausible that those companies which were successful in adopting JIT and those that had decided not to adopt JIT might have participated in the study, whilst those that tried but failed in successful adoption of JIT might have abstained.

Notwithstanding the above limitations, the results of the study have implications for theory and practice. The implication for theory is that the results provide empirical support for the prescriptive literature advocating the benefits of adopting just-in-time manufacturing for making organisations more profitable (Anderson, et al., 1989; Kaplan and Atkinson, 1989; Johansson, 1990; Green, 1991; Cowton and Vail, 1994; Ansari, 1997). So far, empirical research on JIT has been mostly descriptive (Skakibara, et al., 1993). Although descriptive research is an important step toward developing theory on JIT, empirical research is a step forward to test the theory in reality. Moreover, the study also provides empirical support for the view that the management accounting systems, by providing relevant information on performance in JIT adopter organisations, can play a significant role in achieving the organisations' goals, such as profitability. One implication for practice is that an organisation which plans to adopt a strategy like JIT may perform better if it also plans concurrently to upgrade or adapt its MAS. Otherwise, realisation of the full benefits of implementing the strategy may be at least slow. For example, the financial controller in a building products company said:

> 'One of the best things that the company did is introducing JIT six years ago. During the first two years of introducing the system, we had a tough time; things were chaotic. Managers were complaining about lack of supplies, and lack of feedback on their activities with respect to meeting production targets, wastage rate, cost savings, and benchmarking, I mean comparing us with our competitors. We solved most of the problems; we introduced new technology, overhauled our accounting system; we streamlined our contracts with suppliers and customers. Now we are doing OK it is actually more than OK; our profits are on the rise since the year before last.'

Another practical implication for the results is that management accountants in innovative organisations such as JIT adopters could be pro-active in identifying managers' information needs and make necessary changes to the MAS so that the system meets managers' information needs. The system's ability to meet the managers' changing information needs in an innovative organisation is vital for the system's relevance. If the system does not provide the necessary information, managers will simply ignore it, thereby making it irrelevant to their decision-making process (Johnson and Kaplan, 1987; Johansson, 1990).

## Appendix A
## Manufacturing systems in the sample organisations

Please read the following descriptions and then answer the questions that follow.

**FIRM A** produces its products mainly to order; it organises its manufacturing processes as such that the products are generally manufactured just on time to deliver customer orders. The firm makes arrangements with its suppliers to receive supplies according to the requirements of its manufacturing processes. Consequently, the firm's inventory of raw materials and finished products are almost always at the minimum level set out by the management.

For purposes of this study, firm A is presumed to have adopted a just-in-time (JIT) manufacturing approach. JIT is defined as a system under which the goods in one stage of the production-sales cycle are completed just prior to being needed at the next stage

**FIRM B** produces its products generally uninterrupted by the timing of receiving and delivery of customer orders. Manufacturing functions in the firm are performed to attain the production targets set out by the management. The timing and quantities of orders for supplies are worked out according to the planned production targets. Completed products are generally transferred from the factory floor to the godown (warehouse) where the finished products wait for shipments.

For purposes of this study, firm B is presumed to be a non-adopter of a JIT manufacturing approach.

**Question 1:**

Which firm (A or B) represents your company? Please tick against A or B below.

A________

B________

**Question 2:**

If your answer for question 1 above is A, how long has your firm been using the JIT approach?

__________years

**Question 3:**

Is the accounting system in your organisation computerised and online?

Yes________ No________

## Appendix B
## Provision of the MAS information in the sample organisations

The following four questions were used to assess the amount of the information provided by management accounting systems to the operation managers in the sample organisations.

In responding to these questions, the participants used a 1 to 7 scale where 1 represented very low, and 7 represented very high.

| Questions | Factor loadings |
|---|---|
| How much information on performance targets including budgeted production costs, wastage rates, inventory levels, defects, and capacity utilisations for different departments and for the whole organisation does the management accounting system (MAS) in your organisation provide to the department or division managers? | 0.76 |
| How much information on departmental actual performance including achievement of targets relating to production, costs, wastage rates, inventory levels, defects, and capacity utilisations does the MAS in your organisation provide to the managers? | 0.67 |
| How much information on the organisation's overall actual performance include profit, sales revenue, sales volume, and market share does the MAS in your organisation provide to the managers? | 0.65 |
| How much information on overall actual performance trend of the organisation and the industry does the MAS in your organisation provide to the managers? | 0.71 |
| Eigenvalue = 1.97, percentage of variance explained = 49.4 | |

## References

Anderson, R. H., Needles, B. E. Jr. and Caldwell, J. C. J. (1989). *Managerial Accounting*, Houghton Miffin Co.

Ansari, S. (1997). *Management Accounting: A Strategic Focus*. London: McGraw-Hill.

Babad, Y. M. and Balachandran, B. V. (1993). 'Cost driver optimization in activity-based costing'. *The Accounting Review*: 563–575.

Balakrishnan, R., Linsmeier, T. J. and Venkatachalan, M. (1996). 'Financial benefits from JIT adoption: effects of customer concentration and cost structure'. *The Accounting Review*: 183–205.

Bromwich, M. (1990). 'The case for strategic management accounting: the role of accounting information for strategy in competitive markets'. *Accounting, Organizations and Society*: 27–46.

Bromwich, M. and Bhimani, A. (1994). *Management Accounting: Pathways to Progress*. CIMA.

Birnberg, J. G. and Snodgrass, C. (1988). 'Culture and control'. *Accounting Organizations and Society*: 447–464.

Chenhall, R. H. and Morris, D. (1986). 'The impact of structure, environment, and interdependence on the perceived usefulness of management accounting systems'. *The Accounting Review*: 16–35.

Cobb, I. (1993). *JIT and the Management Accountant: A Study of Current UK Practice*. CIMA.

Cowton, C. J. and Vail, R. L. (1994). 'Making sense of Just-In-Time production: a resource-based perspective'. *Omega*: 427–441.

Cronbach, L. J. (1951). 'Construct validity in psychological test'. *Psychological Bulletin*: 297–334.

Currie, W. (1992). *The Strategic Management of AMT in Japan, the US, UK, and West Germany*. CIMA.

Currie, W. (1993). 'The strategic management of AMT in Japan, the US, UK, and West Germany'. *Management Accounting*: 56–58.

Cushing, B. E. and Romney, M. B. (1994). *Accounting Information Systems*. Addison-Wesley.

Daniel, S. and Reitsperger, W. (1991). 'Management control systems for JIT: an empirical comparison of Japan and the US'. *Journal of International Business Studies*: 603–617.

Daniel, S. and Reitsperger, W. (1992). 'Management control systems for quality: an empirical comparison of the US and Japanese electronics industry'. *Journal of Management Accounting Research*: 273–291.

Ferris, K. R. and Haskin, M. E. (1988). 'Perspectives on accounting systems and human behaviour'. *Accounting, Auditing and Accountability*: 3–18.

Golhar, D. Y. and Deshpande, S. P. (1993). 'An empirical investigation of HRM practices in JIT firms'. *Production and Inventory Management Journal*: 28–32.

Goold, M. and Quinn, J. (1990). 'The paradox of strategic control'. *Strategic Management Journal*: 43–57.

Gordon, L. A. (1997). *Managerial Accounting: Concepts and Empirical Evidence* (3rd ed.). London: McGraw-Hill.

Gordon, L. A. and Narayanan, V. K. (1984). 'Management accounting systems, perceived environmental uncertainty and organization structure: an empirical investigation'. *Accounting, Organizations and Society*: 33–47.

Green, F. B. (1991). 'Performance measures and JIT: US companies are revamping traditional cost systems'. *Management Accounting*: 50–53.

Griffin, L. and Harrell, A. (1991). 'An empirical examination of managers' motivation to implement Just-In-Time procedures'. *Journal of Management Accounting Research*: 98–112.

Hayes, R. H. and Garvin, D. A. (1982). 'Managing as if tomorrow mattered'. *Harvard Business Review*: 75–81.

Hiromoto, T. (1988). 'Another hidden edge—Japanese manufacturing accounting'. *Harvard Business Review*: 22–26.

Horngren, C. and Foster, G. (1991). *Cost Accounting: A Managerial Emphasis* (7th ed.). London: Prentice-Hall.

Johansson, H. J. (1990). 'Preparing for accounting system changes: accountants must move from the office to factory floor'. *Management Accounting*: 37–41.

Inman, R. A. and Brandon, L. D. (1992). 'An undesirable effect of JIT'. *Production and Inventory Management Journal*: 55–58.

Johnson, H. T. and Kaplan, R. S. (1987). *Relevance Lost: The Rise and Fall of Management Accounting*. Harvard Business School Press.

Kaplan, R. S. and Atkinson, A. (1989). *Advanced Management Accounting*, (second ed.). London: Prentice-Hall.

Kaplan, R. S. and Norton, D. (1992). 'The balanced scorecard—measures that drive performance'. *Harvard Business Review*: 71–79.

Kaplan, R. S. and Norton, D. (1993). 'Putting the balanced scorecard to work'. *Harvard Business Review*: 134–147.

Kaplan, R. S. and Norton, D. (1996). 'Using the balanced scorecard as a strategic management system'. *Harvard Business Review*: 75–85.

Luckett, P. and Eggleton, I. (1991). 'Feedback and management accounting: a review of research into behavioural consequences'. *Accounting, Organizations and Society*: 371–394.

Macintosh, N. B. (1985). *The Social Software of Accounting and Information Systems*. London: Wiley.

Martin, C. (1994). *An Introduction to Accounting* (4th ed.). New York: McGraw-Hill.

Nunnally, J. C. (1967). *Psychometric Theory*. New York: McGraw-Hill.

Sakakibara, S., Flynn, B. and Schroeder, R. G. (1993). 'A framework and measurement instrument for Just-In-Time manufacturing'. *Production and Operations Management*: 177–194.

Schiff, M. and Lewin, A. Y. (1970). 'The impact of people on budgets'. *The Accounting Review*: 259–268.

Schonberger, R. J. (1982). *Japanese Manufacturing Techniques: Nine Hidden Lessons in Simplicity*. New York: The Free Press.

Schonberger, R. J. (1986). *World Class Manufacturing: The Lessons of Simplicity Applied*. New York: The Free Press.

Selto, F. H., Renner, C. J. and Young, S. M. (1995). 'Assessing the organizational fit of a Just-In-Time manufacturing system: testing selection, interaction and systems models of contingency theory. *Accounting, Organizations and Society*: 665–683.

Simons, R. (1987). 'Accounting control systems and business strategy: an empirical analysis'. *Accounting, Organizations and Society*: 357–374.

Southwood, K. E. (1978). 'Substantive theory and statistical interaction: five models'. *American Journal of Sociology*: 1, 1,154–1,203.

Swieringa, R. J. and Weick, K. E. (1987). 'Management accounting and action'. *Accounting, Organizations and Society*: 293–308.

Yasin, M. M., Small, M. and Wafa, M. A. (1997). 'An empirical investigation of JIT effectiveness: an organizational perspective'. *Omega*: 461–471.

Young, S. M. (1985). 'Participative budgeting: the effects of risk aversion and asymmetric information on budgetary slack'. *Journal of Accounting Research*: 829–842.

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# Consolidation principles and practices for the UK government sector

**David Heald and George Georgiou***

**Abstract**—Government accounting reform has in certain industrialised countries become a recognisable component of market-oriented New Public Management reforms. A key dimension is the conversion of accounting from the traditional cash basis to accruals, usually anchored in GAAP as developed for that country's private sector. Taking the UK proposals for Resource Accounting and Budgeting, this paper shows that issues concerning consolidation are proving both important and troublesome. After reviewing private sector experience with consolidation, the structure of UK central government is carefully mapped. The limited area for consolidation proposed by the UK Treasury as the basis for constructing Departmental Resource Accounts is criticised. Attention is paid to the complex structure of public service delivery, with much of that now done by quasi-public organisations outside both the proposed departmental boundary and the national accounts aggregate of general government. This paper does not examine the related topic of Whole-of-Government Accounts.

## 1. Introduction

In recent years, significant changes have taken place in relation to government accounting across different countries. In the UK, these developments are included in a package referred to as Resource Accounting and Budgeting (RAB). This paper focuses upon the extent and forms of consolidation which are appropriate for accruals-based government financial accounting and reporting. While due attention is paid to developments elsewhere, the importance of context makes it valuable to discuss developments in relation to the specifics of the UK.

Some explanation of UK terminology is essential.[1] Resource Accounting (RA) refers to the alignment of central government accounting and reporting requirements with those for companies incorporated under the Companies Act (1985, 1989), thereby complying with that body of principles and practice customarily described as 'UK GAAP'. A significant element is the switch from cash to accruals. However, it is explicit in Treasury policy documents that differences in circumstances between the private sector and central government may necessitate certain modifications of, and extensions to, UK GAAP; these have been incorporated into the Resource Accounting Manual developed by the Treasury and approved by the Treasury-appointed Financial Reporting Advisory Board (FRAB). The Treasury established FRAB in April 1996 to act as 'an independent element' in the regulation of government accounting and reporting. The FRAB-approved Manual was released by the Treasury in July 1997 and then formally published, including updating amendments, in April 1998 (Treasury, 1998b).

Resource Budgeting (RB) has two components: the first is the conducting of the public expenditure planning process on a resource basis; and the second is the annual voting by Parliament of Supply (i.e. expenditure authorisation) on a resource basis.[2] The Treasury has frequently stressed that its commitment to adopt both components of RB is an important reason why the Treasury itself must

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[1] For ease of reference, a glossary of UK terminology appears in the Appendix.

[2] Since the late 1960s, the Treasury has planned public expenditure by means of the Public Expenditure Survey (PES), conducted annually for (in recent years) a three-year planning period. Exceptionally, PES 1997 and 1998 were cancelled by Gordon Brown (Chancellor of the Exchequer in the Labour government elected in May 1997), so that priority could be given to a wide-ranging Comprehensive Spending Review. In June 1998, it was announced that annual surveys would no longer be held; aggregates fixed for three fiscal years were announced in July 1998. However, the introduction of RB as from 2001–02 would be accompanied by a survey in 2000 which would set aggregates on a resource basis for the years 2001–02 to 2003–04.

have ultimate control over government accounting principles.

The purpose of this paper is to evaluate UK proposals for departmental financial accounting and reporting, focusing upon the delineation of the consolidated reporting entity (i.e. the production of consolidated Departmental Resource Accounts (DRAs)). The topic of consolidating all DRAs with other accounts into Whole-of-Government Accounts is not addressed. There is nevertheless a connection between the issues because the Treasury explicitly connects RA with its macro-fiscal data requirements, which are driven by international statistical standards for national accounts, notably the European System of National Accounts 1995 (Eurostat, 1996; Jones and Lüder, 1996).

The paper is structured as follows. Section 2 reviews UK government proposals on consolidation. Section 3 examines the substantive issues, dealing with the relevance of private sector experience and the specific UK public sector context. This discussion is also informed by international experience. Section 4 draws conclusions about UK developments, which need to be located in the wider context of financial management reforms in central government. Certain important issues, such as the origins of these reforms and the linkage with New Public Management (NPM), are excluded from the remit of this paper. However, it should be noted that the architect of the UK reforms (Likierman, 1995, 1996) has frequently portrayed accruals accounting and budgeting as reflective of an international trend (Lüder, 1988) and as a key part of the NPM agenda (OECD, 1993). Power and Laughlin (1992) have described these processes as the 'accountingisation' of the public sector.

## 2. UK government proposals on public sector consolidation

The then Chancellor of the Exchequer announced the RAB project in his November 1993 Budget Speech (Clarke, 1993). However, substantive details were not available until July 1994, when the Treasury published a consultative Green Paper (Treasury, 1994). For the purpose of this exposition, three diagrams focus attention upon the key issues concerning the area of consolidation for each DRA.

Figure 1 reproduces from the Green Paper the diagram which specified the scope of each DRA. The envisaged DRA covers the area of the principal circle, including the interior circles representing executive agencies (both vote-financed and trading funds). A significant set of governmental bodies is therefore shown outside their respective DRAs: nationalised industries, Non-Departmental Public Bodies (NDPBs), public corporations, National Health Service and local authorities (Deaton, 1996a; Deaton, 1996b).

The Treasury's definitive policy statement appeared as a White Paper in July 1995 (Treasury, 1995a).[3] Figure 2 reproduces the relevant diagram from the White Paper, with certain modifications and elaborations.[4] In Figure 2, everything within the circumference of the principal circle will again be consolidated in the DRA. The core department is the total area of the principal circle less the areas of the two interior circles and the area of overlap with the NDPB circle. One interior circle represents vote-financed executive agencies; those agencies with trading fund status, though inside the DRA in Figure 1, are now outside. The second interior circle represents NHS purchasers; NHS providers (almost entirely corporatised as NHS Trusts) are now outside the DRA. This differs from Figure 1, where the NHS was entirely outside. Compared with Figure 1, the treatment of NDPBs has become substantially more complex: the overlap of the NDPB circle with the principal circle represents those NDPBs which fall within the DRA. In practice, these are mostly unimportant (in expenditure terms) advisory bodies and some small non-self-accounting Executive NDPBs.[5] All the big-spending Executive NDPBs are outside the DRA. Moreover, all public sector organisations represented by circles entirely outside the principal circle are beyond the departmental boundary and therefore will not be consolidated.

The shaded area of Figure 2 maps general government for the purposes of the national accounts. The definition of general government is of immense importance because of the way in which the Treasury has taken General Government Expenditure (GGE), or its variant GGE(X), as its ultimate control target (Thain and Wright, 1995).[6]

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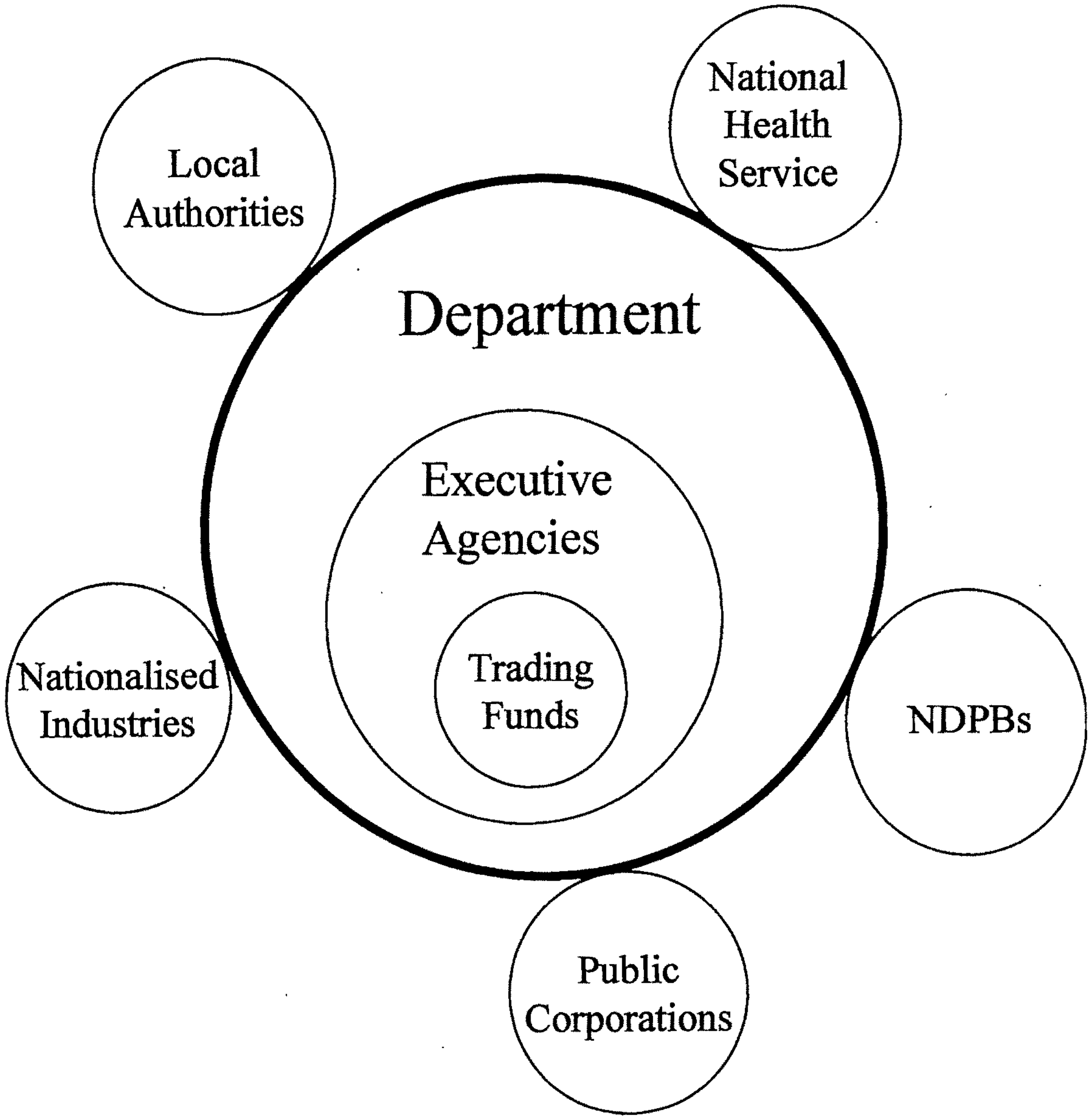
[3] An overall exposition of the proposed UK reforms can be found in the report to Parliament by the National Audit Office (1996).

[4] Figure 2 differs from the equivalent Diagram 3 in the July 1995 White Paper (Treasury, 1995a) in three respects. First, the shaded area in Figure 2 denotes general government for national accounts purposes. Second, Figure 2 makes explicit that NHS purchasers are inside the departmental boundary and NHS Trusts are outside, whereas the White Paper's Diagram 3 simply showed some overlapping between the principal circle and the NHS circle. Third, more detail is shown in Figure 2 regarding NDPBs: the overlap between them and public corporations is shown, as is the fact that those NDPBs with the status of companies limited by guarantee are outside general government.

[5] See the Appendix for a discussion of the types of NDPB. In the text, the term 'Executive NDPBs' is used for convenience, though the correct term is 'Executive etc. NDPBs' (reflecting the importance of bodies with regulatory rather than executive missions).

[6] See the entries for Control Total and Total Managed Expenditure in the Appendix. In national accounts, general

**Figure 1: The 1994 Green Paper's Departmental Boundary**



*Source:* Redrawing of Figure 1 of Treasury (1994:12).

Beyond the departmental boundary, general government includes local authorities and those NDPBs outside the departmental boundary which are neither public corporations nor companies limited by guarantee. There is an overlap between NDPBs and public corporations, particularly with regard to economic development bodies. Moreover, some Executive NDPBs are incorporated as companies limited by guarantee and thereby classified to the private sector in the national accounts.

When RA is implemented in 2001–02, two forms of consolidation will be undertaken, with a third scheduled for later implementation. The DRAs of each of the 65 departments will consolidate organisations falling within the relevant departmental boundary. Moreover, organisations outside the departmental boundary will continue to follow the

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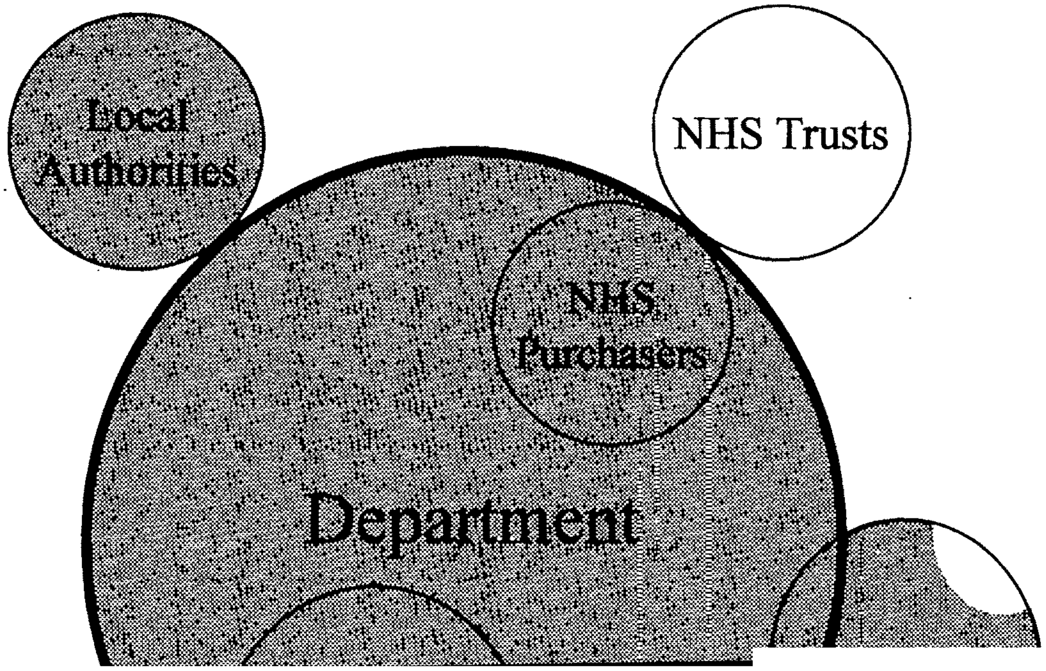
government consists of central government and local authorities. Outside general government but part of the public sector are public trading enterprises and public financial enterprises; UK privatisation has transferred virtually all of these to the private sector.

Figure 2: Resource Accounting's Departmental Boundary



for Executive accountability to Parliament, being aligned with the form in which Parliament authorises Supply; this is the context of the 1994 Green and 1995 White Papers. The Treasury clearly views Parliament as the principal external user, given constitutional relationships in a parliamentary democracy. Moreover, the Treasury will itself use them as building blocks for broader constructs, notably Whole-of-Central-Government Accounts and macro-fiscal aggregates defined on a national accounts basis. A significant change after the May 1997 election has been that the Treasury now emphasises the place of RAB within fiscal policy, particularly in relation to the statutory *Code for Fiscal Stability* (Treasury, 1998a).

There has been a long-running UK debate about the accountability and legitimacy of quasi-government bodies, often revolving around suspicions that patronage prevails in this 'hidden' or 'moonlight' world (Barker, 1982; Birkinshaw et al., 1990; Flinders and Smith, 1998). This paper restricts its attention to the financial accounting and reporting dimension. The most important of such bodies (usually Executive NDPBs) are outside the DRA, which will be published without any segmental disclosure (e.g. executive agencies). As yet, there has been little public discussion of the balance to be struck between consolidation and disclosure. All self-accounting bodies will continue to publish their own accounts, irrespective of whether they fall inside or outside the DRA. In December 1998 the Treasury proposed that FRAB's remit should be extended to include the financial statements of all NDPBs and trading funds. Note that the original 1996 remit of FRAB was restricted to those bodies which the Treasury proposed would be consolidated in the DRA.

## 3. Consolidation in the public sector

This key section of the paper is structured in the following way. Given that UK GAAP is being extended to central government, it is useful to consider the relevance of private sector experience with consolidation. Attention then turns to the specific UK public sector context, beginning with problems in specifying the parent entity, before discussing alternative areas of consolidation.

### *3.1. Relevance of private sector experience*

The very purpose of consolidation in the private sector is to transcend the question of legal relationships so that economic entities can be reported upon. Subsidiaries will have a distinct legal identity deriving from incorporation under the Companies Act. The decisive criterion for consolidation in UK GAAP is that of control and not that of ownership. Consolidated accounts bring in the financial position of all subsidiaries, some of which may be heavily indebted and, if not consolidated, would afford opportunities for off-balance sheet financing by the parent company. Moreover, consolidation brings together the financial results of the parent and all subsidiaries, thereby eliminating opportunities for income smoothing through timely dividend payments from subsidiaries to the parent.[8]

In consequence, defining the boundary of a reporting entity is of utmost importance, since this determines the entities which are encompassed by the consolidation report. A subsidiary is defined in the UK as any company which is controlled, directly or indirectly, by the parent or one over which the parent can exercise dominant influence, meaning that the parent can dominate the subsidiary's operating and financing decisions. Ownership is not considered as a separate criterion but is only regarded as an indicator of control. The current UK standard (FRS 2) insists that virtually all subsidiaries are consolidated,[9] including those engaged in activities dissimilar to those of the rest of the group. For example, Marks & Spencer plc has since 1990–91 fully consolidated its subsidiaries dealing in financial activities. Previously, it had followed the provisions of SSAP 14 (ASC, 1978), which mandated that subsidiaries engaging in dissimilar activities should *not* be consolidated. These SSAP 14 provisions had opened up a mechanism which might have been used for off-balance sheet financing, thereby concealing the indebtedness of groups. These considerations motivated the decisions of the Financial Accounting Standards Board (FASB, 1987) in the US and the Accounting Standards Board (ASB, 1992) in the UK to mandate consolidation.

However, such use of regulation has been criticised in the agency-contracting literature as being

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accounting is the priority. The Government undertakes to report on this in due course.

The outcome of the subsequent scoping study, published in July 1998 (Treasury, 1998d), has brought a commitment to a Whole-of-Central-Government Account. However, such a consolidation has not been seen as an integral part of RAB. Incidentally, the wording above ('a simple aggregation of departmental resource accounts') in the quotation from the Public Accounts Committee is unfortunate: the meaning should be taken as consolidation.

[8] It is not argued here that full consolidation is the only means of achieving this: the use of the equity method of accounting for inter-company investments produces a net profit figure which is identical to the one reported in the consolidated statements.

[9] Under FRS 2 (ASB, 1992: para. 25), the exclusions from consolidation are subsidiaries: (i) which are held with a view to subsequent resale; (ii) where there are severe long-term restrictions over the parent's rights; and (iii) where their activities are so dissimilar from those of the rest of the group that their inclusion in the consolidated statements would be incompatible with the obligation to give a 'true and fair' view.

economically costly. This literature has contended that the non-consolidation of subsidiaries engaging in dissimilar activities reflected the adoption of the most efficient contracting relationship, rather than opportunistic management behaviour in financial reporting (Mian and Smith, 1990). Such research findings did not, however, inhibit the ASB from extending the mandated area of consolidation. The notion of 'quasi-subsidiaries' has been devised as a mechanism for pulling certain organisations within the net of consolidation. A quasi-subsidiary is defined in FRS 5 (ASB, 1995b: para. 7) as:

> '...a company, trust, partnership or other vehicle that, though not fulfilling the definition of a subsidiary, is directly or indirectly controlled by the reporting entity and gives rise to benefits for that entity that are in substance no different from those that would arise were the vehicle a subsidiary.'

This formulation was introduced to catch any company which is in substance part of the same economic entity, but which would not have qualified as a subsidiary under either the Companies Act 1989 or FRS 2.

When devising accounting standards on consolidation, private sector standard-setters did not explicitly state the conceptual basis of their requirements. Indeed, ED 50 (ASC, 1990) was the first UK pronouncement to refer to the potential usefulness of consolidated statements to parent company and minority shareholders. The former were identified as 'the users for whom consolidated accounts are primarily prepared' (para. 28). This view was reiterated in ASB's draft *Statement of Principles for Financial Reporting* (ASB, 1995a: para. 7.17), though it was also acknowledged that consolidated statements may provide a frame of reference for other report users, such as the creditors of subsidiary companies.

The conceptual approach adopted by ASB is a hybrid between the two major concepts of consolidation, which both suggest that parent company shareholders are the primary external users of consolidated statements but differ on the nature of the consolidated information which would best serve their interests. *Proportional* consolidation, for example, stresses the ownership interests of the parent company shareholders. Consolidated statements are viewed as a modification of the parent company financial statements in order to account for the ownership interests of the parent company in other entities. Consequently, only the parent company's *share* of each subsidiary's assets, liabilities, revenues, expenses, gains and losses are included in the consolidated statements. On the other hand, the *entity* concept considers consolidated statements to be those of an economic entity which consists of a parent company and any company controlled by it; consolidated statements are prepared for the purpose of reporting the resources which are controlled—rather than owned—by the parent company shareholders, and the results achieved with these resources. Unlike proportional consolidation, which excludes minority interests from the consolidated statements, the entity concept includes them and, furthermore, does not treat them differently from the controlling (parent company) interests. This is because the minority shareholders are considered to be co-shareholders with the parent company shareholders: both provide part of the capital of the economic entity.[10]

### *3.2. Specific UK public sector context*

#### *3.2.1. Defining the parent—'the government department'*

Under the RAB proposals, the department is analogous to the parent company in the private sector context (i.e. the entity which has control over other entities and is required to produce consolidated statements). However, there is no clear-cut definition of a government department, in statute or elsewhere, though there are some departments with a statutory basis (e.g. the Inland Revenue and the offices of the utility regulators). Government offices and departments owe their establishment and organisation, together with any powers they possess and duties they perform, partly to the Royal Prerogative and partly to Parliament (Bradley and Ewing, 1997).[11] The meaning of the term 'department' depends on the particular context in which it is used; indeed, different official lists produce variable numbers of government departments (McLean and Clifford, 1996). Jordan (1994:44) concluded:

> 'The [search] for an understanding of the organisation of British Government is best made by seeking historical explanations of particular arrangements than for a set of principles that underpin the complexity. Not only is the subject of Government lost in a fog, we have no reliable and accessible model or maps to help us through.'

However, this 'disorder' (Jordan, 1994: 11) acquires more practical importance when a government department is defined to be the parent for the purposes of RA.

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[10] For comprehensive discussions of the different concepts of consolidation, see Moonitz (1951), Walker (1976), Parker (1977), FASB (1991) and Taylor (1996).

[11] The Australian standard (AAS 29), which also uses the government department as the reporting entity, defines it as 'a government controlled entity, created pursuant to administrative arrangements or otherwise designated as a government department by the government which controls it' (AARF, 1993, para. 8).

The extension of UK GAAP to central government, notably the construction of balance sheets, renders these ambiguities more salient than under cash accounting (Heald and Georgiou, 1995). Lacking definitive guidance, the Treasury has adopted the existing Parliamentary voting and reporting arrangements as the starting point for DRAs. At present, 65 DRAs (59 plus six for Northern Ireland departments) are envisaged (Treasury, 1996). The Treasury's suggestion that the configuration of accounting entities would be an appropriate subject for consultation between departments and their select committees jars with the extension of (the increasingly rule-based) UK GAAP to central government. Successive UK governments have restructured the shape of central government for a complex mixture of motives, including improving the effectiveness of the machinery of government and making work for would-be ministers. The implementation of RAB is unlikely to alter such political realities. However, there are substantial practical implications for how such mergers and demergers of departments will be accounted for, and the demands on information systems for data about shuffled components, so that a reasonable level of data comparability over time can be secured.

### 3.2.2. *Area of consolidation*

Sensitivity to the prerogatives spelled out in successive editions of the 'bible' of parliamentary procedure, *Erskine May* (Boulton et al., 1989; Limon, McKay et al., 1997), led the Treasury to adopt a consultative, consensus-seeking style in its dealings with Parliament on the RAB project. This has differed markedly from Treasury practice concerning public expenditure planning, where fundamental changes are often sprung without warning (Heald, 1995). However, the Treasury has proved unyielding in its view that the area of consolidation for DRAs should be highly restrictive. The adjustment in the departmental boundary between the 1994 Green Paper and the 1995 White Paper was a limited technical one, conceding nothing of substance to those who argued during the consultation phase for more extensive consolidation.[12] While there has been much emphasis upon the benefits of applying UK GAAP to central government (Likierman, 1995), the area for consolidation was determined as a firm policy decision by the Treasury, long before FRAB had been conceived of, still less constituted.

The Treasury's prescription of the area of consolidation is reminiscent of the ways in which the Accounts Directions of Executive NDPBs have sometimes been used; namely, prescribing accounting treatments which conflict with UK GAAP and arguably with statutory requirements in the relevant primary legislation to follow 'best commercial practice'. The principal substantive argument used for restricting consolidation has been that Executive NDPBs, nationalised industries and local authorities are 'constitutionally independent bodies' and that ownership of assets and liabilities is not vested in the department (Treasury, 1994: para. 2.22). This is a surprising argument in that consolidation in the private sector has been about piercing the 'veil of incorporation'. A subsidiary argument used by the Treasury has been that the departmental boundary defined in the proposed way would correspond to the responsibilities of the Department's Principal Accounting Officer. Irrespective of these arguments, it is clear that the Treasury's requirements concerning the area of consolidation are in conflict with UK GAAP, and they also differ from the Australian standard (AAS 29) that requires departments to consolidate all entities which they control.[13] Control of an entity is defined in AAS 29 as:

> '...the capacity of an entity to dominate decision-making, directly or indirectly, in relation to the financial and operating policies of another entity so as to enable that other entity to operate with it in pursuing the objectives of the controlling entity' (AARF: 1993, para. 8).

### 3.2.3. *Measures of control in the public sector*

In the private sector, control is inextricably linked to the operation of various kinds of ownership rights, whereas everything is much fuzzier in the public sector. Behaviour in the public sector is more difficult to predict, not least because there is much more scope for decisions to be contested. There is a huge political science literature on the nature and ambiguities of control: see, for example, Dunsire (1985) and Wirth (1985). Given the definition of the department as the reporting entity, it is beyond the scope of this paper to fully explore the concept of control in the public sector. Such a pursuit would most probably lead the discussion away from departmental reporting and back to the issue of Whole-of-Government Accounts. The focus here is with the concept of control as relevant to the specific and more limited purpose of determining those entities controlled by the department.

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[12] CIPFA (1995: paras. 2.24–27) considered that the application of FRS 2 would 'confirm the "exclusion" of the nationalised industries, public corporations and local authorities from departments' resource accounts', but suggested that National Health Service bodies and non-Executive NDPBs should be brought within the scope of the DRA.

[13] 'The general purpose financial report of the government department shall encompass all entities controlled by the government department' (AARF, 1993: para. 24).

In the private sector, subsidiaries have a legal identity deriving from incorporation under the Companies Acts, while public sector bodies are frequently incorporated pursuant to Acts of Parliament. Though it is customary to speak of assets being vested in a Crown body, it is not customary in the UK to speak of one Crown body having an ownership interest in another Crown body: this limits the easy transfer of the commercial analogy of looking to ownership as an indicator of control.

In order to establish what constitutes control in a public sector context, crucial questions must be addressed about the nature of relationships between a department and its NDPBs, and between those NDPBs and the quasi-public sector bodies—classified to the private sector by the Office for National Statistics—which actually undertake much service delivery. In the context of extensive purchaser-provider separation, the Treasury may liken purchaser-provider relationships to commercial relationships in the market sector, as, for instance, between Marks & Spencer plc and textile firms for which it is the dominant purchaser. It is therefore necessary to explore the nature of the relationships between, for example, the Department of the Environment, Transport & Regions *and* the Housing Corporation *and* housing associations; and between the Department for Education and Employment *and* the Higher Education Funding Council for England (HEFCE) *and* Higher Education Institutions (HEIs).

One indicator of control is the right of the relevant Secretary of State to appoint the majority of members of the board, which is the case with the Housing Corporation and HEFCE, but not with housing associations or HEIs. The Companies Act 1989 and FRS 2 set out criteria to indicate that a company is the subsidiary of another company; these include that the parent:

> '(a) holds a majority of voting rights in it or (b) is a member and has the right to appoint or remove a majority of its board of directors or (c) has the right to exercise dominant influence over the undertaking' (FRS 2, para. 14: ASB, 1992).

Condition (a) is of modest relevance only; UK public sector organisations are rarely constituted as companies with shareholdings and therefore there is no parallel to membership. Regarding (b), there is a trend in certain policy areas (e.g. higher education and research) for ministers to abrogate this power of appointing a majority of board members. Regarding (c), the mechanisms in the private sector for exercising dominant influence would be by provisions in the articles of association of the controlled undertaking, or a written control contract which has been authorised in the memorandum or articles of association of the controlled undertaking and which does not breach any law.

It is a characteristic feature of NPM that public service delivery increasingly takes place through entities outside the departmental boundary, establishing relationships with departments or funding/purchasing bodies which Sizer (1992: 29) has characterised as 'vertical quasi-integration'. After the implementation of NPM reforms, control is frequently exercised through contracting and funding mechanisms.[14]

Figure 3 reproduces the entries in Figure 2 relating to the NHS and NDPBs/public corporations, extends the diagram to show the relevance of the quasi-public sector and introduces the issue of public employee pension schemes. Beyond the DRA, there is a constellation of 'moons' which themselves may have 'satellites'. Quite often, the core department will feed moons which in turn feed satellites, with the payments being described as grants or as contractual payments for output. Three cases will now be considered for the insights they bring into the difficulty of operationalising control and accounting for transactions across the boundary. They raise the question as to whether organisations which are fiscally dependent upon a department should be regarded as controlled by that department, and draw attention to the opportunities for off-balance sheet financing which occur when fiscally dependent organisations are excluded from the area of consolidation.

The first case to be discussed with reference to Figure 3 concerns the NHS. The assets and liabilities of about 550 NHS Trusts are outside the relevant DRAs.[15] When NHS Trusts finance capital

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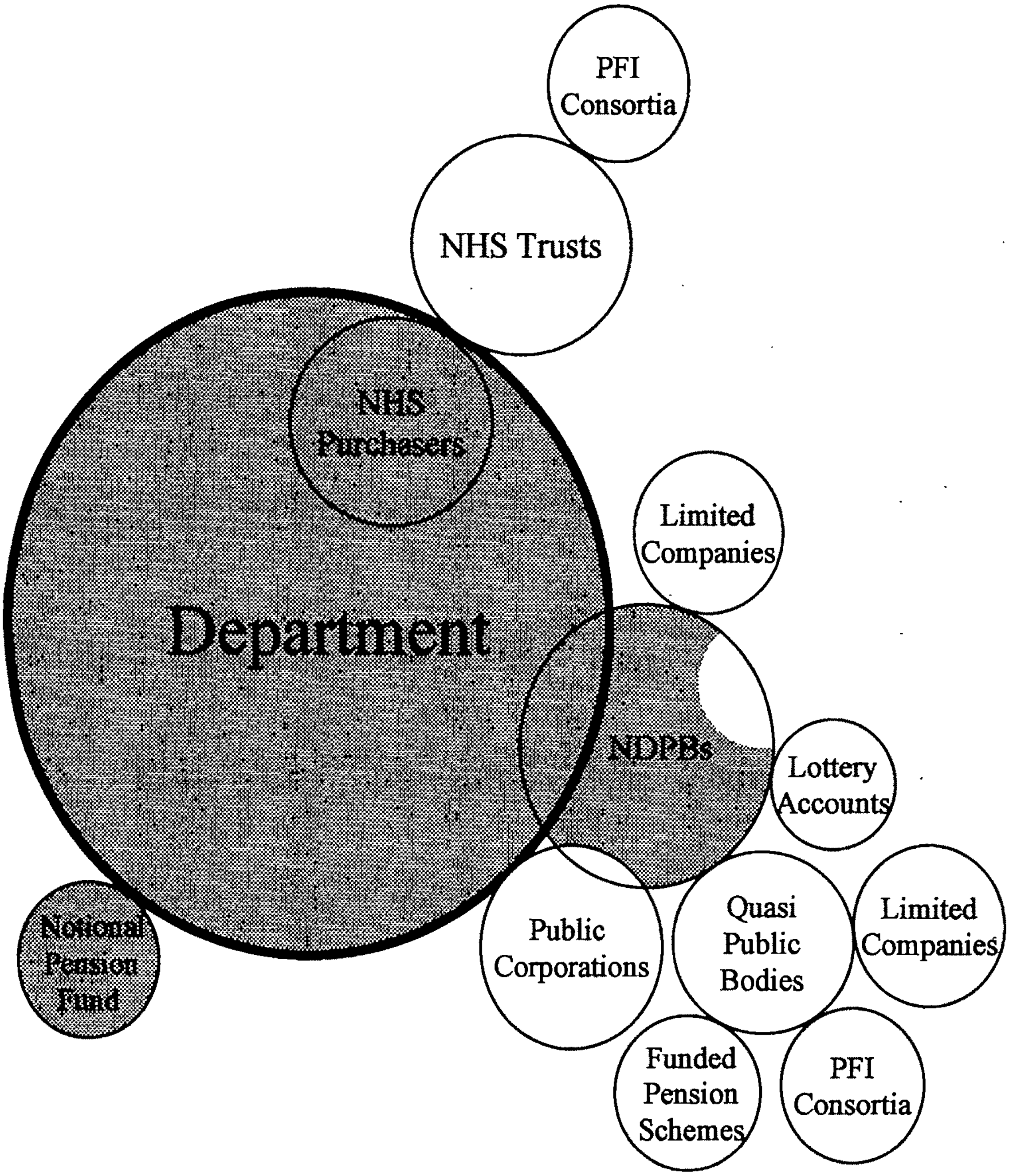
[14] Insights can be gained from US experience in relation to the regulation of state and local governments, which is undertaken by the Government Accounting Standards Board (GASB). In particular, GASB 14 uses 'fiscal dependence' as a test for financial accountability, which it takes as the criterion for determining the boundary of the reporting entity: 'The definition of the reporting entity is based primarily on the notion of financial accountability. A primary government is financially accountable for the organisations that make up its legal entity. It is also financially accountable for legally separate organisations if its officials appoint a voting majority of an organisation's governing body *and* either it is able to impose its will on that organisation or there is a potential for the organisation to provide financial benefits to, or to impose specific burdens on, the primary government. A primary government may also be financially accountable for governmental organisations that are fiscally dependent on it' (GASB, 1991, summary on unnumbered page). Walker (1995) also emphasised fiscal dependence as a criterion for consolidation in his paper informed by Australian experience.

[15] The NHS is managed separately in each of the four territories of the UK, so that four DRAs will be involved: Department of Health; Scottish Office; Northern Ireland Department of Health and Social Services; and Welsh Office. An additional complication is that the NHS is now a devolved function in Scotland, Wales and Northern Ireland.

**Figure 3: Resource Accounting and the Quasi-Public Sector**



*Source:* Developed as an extract from Figure 2.

asset acquisition through the Private Finance Initiative (PFI), the assets are owned, financed and operated by private sector consortia. At present, only a minute part of the NHS functions in this way, though there are plans for a massive extension of this model. A number of questions arise about the nature of the contracts between organisations within the DRA (NHS purchasers) and public sector bodies outside the DRA (NHS Trusts), and again between NHS Trusts and PFI consortia. In particular, the (potentially extensive) borrowing of such consortia would be a form of off-balance sheet finance for the public sector. If NHS Trusts had themselves been allowed to borrow from the private sector, this would have been outside the Public Sector Borrowing Requirement (as public corporations they are outside general government). The reconfiguration of public service delivery through NPM reforms has therefore accentuated the importance of mapping commitments which arise from contractual mechanisms such as the PFI.[16] Borrowing by PFI consortia is classified as private borrowing. This is unsettled territory in terms of accounting treatments. The July 1997 issue of the Resource Accounting Manual postponed discussion of the treatment of PFI schemes until Treasury guidance was available. Subsequently, ASB (1997, 1998) has published its standard (FRS 5A), which would bring more assets on-balance sheet than the Treasury's interim guidance (Treasury, 1997). At the time of writing, it remains unclear whether the Treasury will mandate compliance with FRS 5A.

The second case highlighted by Figure 3 occurs when the department feeds NDPBs outside the DRA. These then feed organisations (technically private, but best viewed as quasi-public because of their overwhelming dependence on public funds) which may then enter into contracts with PFI consortia which finance, own and operate assets. Four examples can be cited, relating to: HEIs; non-local authority social housing; economic development including training; and tourist promotion. The Scottish Office (parent department) funds the Scottish Higher Education Funding Council (Executive NDPB which is outside the DRA but within general government), which funds HEIs (technically private, though really quasi-public), which build residences and teaching buildings through PFI contracts (Livingston, 1997). The Scottish Office also funds Scottish Homes (Executive NDPB which is outside the DRA and is also a public corporation), which funds housing associations (technially private, though really quasi-public), which borrow on the security of the full value of their highly subsidised assets. Similarly, the Scottish Tourist Board (Executive NDPB), funded by the Scottish Office, itself funds the network of Area Tourist Boards (ATBs), which are statutory bodies established under the Local Government (Scotland) Act 1994. In none of these three examples is there consolidation of the service delivery organisations with the funders. The fourth example is the exception; the Scottish Office funds Highlands & Islands Enterprise (HIE) (Executive NDPB which is outside the DRA and is also a public corporation), which in turn funds Local Enterprise Companies (LECs), which are companies limited by guarantee. The financial relationships between HIE and its LECs have attracted an untypical level of media and political attention.

Sectoral consolidation is found in *Highlands & Islands Enterprise Network Accounts 1995–96* (Comptroller & Auditor General, 1996), which from that year are required to be produced in accordance with Section 227 of the Companies Act 1985, exemption having previously been granted through a Treasury-approved Accounts Direction (Scottish Office, 1992). This sectoral consolidation is entirely outside the general government boundary. The stricter terms of FRS 2, compared to those of SSAP 14, in terms of allowing exclusion from the area of consolidation, reinforced the Companies Act requirement and led to audit qualifications in 1992–93, 1993–94 and 1994–95 for the non-consolidation of LECs, whereas there had been no qualification in 1991–92 (HIE's first accounting year). In essence, the audit qualification was a challenge to the Accounts Direction. Following the issuing of a new Accounts Direction (Scottish Office, 1996), HIE fully complies with FRS 2. A consequence of these developments is that there are Balance Sheets for HIE and for the HIE network, but an Income & Expenditure Account and Cash Flow Statement only for the HIE network. This occurs despite the fact that HIE is within the public sector and the LECs are in the private sector for national accounts purposes.

The third case highlighted by Figure 3 concerns the relationship between public and quasi-public bodies and the pension funds established for their employees. These may be funded schemes (in which case the concern is whether they are in deficit), or notional schemes (in which case the Exchequer is directly or indirectly liable to pay the pensions when these become due). The employees of departments are likely to be in notional pension funds; in recent years, departments have each year been charged with an amount equal to the employer cost of the future benefits accrued by employees in post in that year. However, the Civil Service Superannuation Scheme is a liability of the government as a whole, not of individual departments. These liabilities are therefore excluded from DRAs, though the Treasury has promised that 'scheme statements' will be presented to Parliament. A Public Accounts Committee (1996) hearing on the chronic mismanagement of the notional Teachers' Superannuation Scheme (England and Wales) revealed, almost in passing (Bichard, 1996), that a funded scheme would need to stand at £70 bn—the equivalent of 23.4% of GGE(X)[17]—in 1995–96. Even in the case of funded schemes, the financial cost of downsizing public organisations is frequently met in part by early retirement packages involving charges on the pension fund. In such cases, it will be the quasi-public bodies which are legally liable for outstanding liabilities, though their heavy dependence on public funds puts the Exchequer at risk.

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[16] Moonitz (1951: 24) cited the private sector example of Bethlehem Steel which consolidated Cambria Iron Company, in which it owned no shares but had leased all its assets under a 999-year lease.

[17] GGE(X) is the public expenditure aggregate which the Treasury (1998c) targets for macroeconomic policy.

Taking Figures 2 and 3 together, there are six boundaries of importance:

(a) the departmental boundary for the DRA (as defined by the Treasury);
(b) the 'government' boundary (as would be defined by the unconstrained application of UK GAAP);
(c) the central government boundary as defined by the Treasury in accordance with the internationally prescribed System of National Accounts 1993 (SNA) (Inter-Secretariat Working Group on National Accounts, 1993) and its EU variant, the European System of Accounts 1995 (Eurostat, 1996);
(d) the general government boundary (as defined on the above national accounts basis);
(e) the relevant boundary as defined for the purposes of the Maastricht Treaty and used to monitor compliance with the Excessive Deficits Protocol (Office for National Statistics, 1997); and
(f) the fuzzy boundary of the public *plus* quasi-public sector.

Except in the case of boundary (f), this listing uses terms in a strict technical sense, following SNA and UK GAAP. A practical difficulty is that much public discussion uses terms like 'government' and 'public sector' in ways which are, deliberately or unintentionally, lacking in precision. Although this paper is primarily concerned with boundary (a), the macro-fiscal context and public policy framework mean that the importance of these wider boundaries must not be neglected.

It is evident from the above that multiple score-keeping systems will cause confusion and may be exploited for purposes of creative accounting. Examples, including the PFI and private borrowing by housing associations, have already been discussed. Two topical examples complete this section. First, the Education and Employment Committee (1997: para. 33) of the House of Commons has made a proposal designed to 'resolve' the accounting difficulty that student loans will count against the PSBR. Instead of the government itself borrowing, HEIs would borrow through a not-for-profit trust, with the 'bad debt provisions' being 'underwritten' by the Treasury. There are several examples, both in the Committee's report and in the accompanying evidence volume, of how lobbies linked to spending departments will 'pick and choose' between accounting rules. Having welcomed RA (and urged its advanced implementation concerning student loans), the Report then intriguingly claimed it an advantage that 'the cost of meeting the bad debt provision would be many years down the line' (paras. 31 and 33).

Second, two reports commissioned by the Chartered Institute of Housing have argued the case for establishing local housing companies as a mechanism for taking local authority borrowing for council housing outside the PSBR (Hawksworth and Wilcox, 1995; Radcliffe, Hawksworth and Glanville, 1996). One of the arguments advanced is that this would put local authorities on to the same basis as housing associations. Whatever the substantive merits of these two cases, neither lobby affects to know of other good causes which might also benefit from creative accounting!

## 4. Conclusions

This investigation of consolidation issues, seemingly highly technical and narrow in focus, raises a number of issues of fundamental principle, both about accounting as applied to government and about the meaning of concepts widely appealed to in discussions of government, such as accountability, control and transparency. The topic therefore has both substantive importance ('seeing the whole picture') and procedural importance (restricting the area of consolidation was a Treasury decision pre-dating the establishment of FRAB). Moreover, this paper has cast light upon some of the ways in which the government sector is relevantly different from the private sector when accruals accounting is in operation.

First, the idea of control is substantially more difficult to operationalise. Moreover, pursuit of the idea of control may raise conflicts with other principles, such as accountability. If interpreted in terms of fiscal dependence, the criterion of control might lead to a vastly expanded area of consolidation in UK government, embracing both separately elected local authorities and even those parts of the quasi-public sector which most observers would regard as primarily private in character. Whereas appeal to GAAP provides a welcome safeguard against manipulation by preparers, such anchoring should not inhibit the search for styles of government financial reporting which address user needs and reflect institutional context (International Federation of Accountants—Public Sector Committee, 1998; Office of the Auditor General of Canada and United States General Accounting Office, 1986). In particular, the application of UK GAAP to government confronts problems originating from the way in which government confers unrequited benefits (e.g. capital grants to finance asset acquisition) outside the departmental and general government boundaries, thereby creating a new asset which it does not own but over whose use it may retain substantial influence. In some cases, extending the area of consolidation based on the notion of control would resolve this problem, yet there would also be cases when the resulting asset is genuinely privately controlled.

Second, problems arise as to the appropriate methods of accounting for transactions across the DRA boundary, especially when this has been drawn in a restrictive manner. One of the most obvious effects of NPM reforms has been to further fragment the machinery of government and confer private sector status on various activities, thereby heightening the importance of accounting as a mechanism for portraying the broader picture. The full implications for the Treasury of having established FRAB, with direct links to ASB through overlapping membership, may not have been digested. In particular, the Treasury has always valued its control of public expenditure definitions as a device for policy presentation and obfuscation. Notwithstanding current rhetoric about transparency, this seems unlikely to change. It therefore seems likely that its current conflict with ASB over the PFI will be replicated on other issues (Broadbent and Laughlin, 1999), especially when 'doing good by stealth' (much-needed hospitals) clashes with 'honest accounting' (off-balance sheet finance). These issues concerning accounting regulation raise the possibility that it is indeed the adoption of an accruals basis for government accounting which is forcing into the open irrational or hitherto tacit understandings about the machinery of government.

Third, there is a surprising lack of disclosure requirements concerning the relationship of the consolidated entity with entities (e.g. NDPBs) which are excluded from the area of consolidation. The rather unique and complex nature of these relationships deserves full disclosure in the Notes to the DRA. Such disclosure would enhance the transparency of a department's financial affairs, allowing report users to produce, if they wish, 'home-made' consolidations. What makes disclosure particularly important is that there are inevitably problems attached to the interpretation of government financial statements, whether consolidated or not. Obvious among these are that liabilities (e.g. unfunded pensions) are much more under the discretionary control of government than would ever be the case for private sector decision-makers. Moreover, future tax revenues (which will be the means of meeting these liabilities as they mature) are not capitalised, thereby aggravating the difficulty of interpreting the 'General Fund'. One of the greatest concerns is that the DRA, defined as the reporting entity, is 'evacuated' of both assets and liabilities, which are then transferred 'outside'.

# Appendix: Glossary of UK terminology

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|---|---|
| **Appropriation Account** | The end-of-year cash-based account which compares amounts authorised by Parliament in Supply Estimates with actual cash payments made and receipts brought to account and explains any substantial differences. One is prepared for each Vote. |
| **Control Total** | From 1993–94 to 1998–99, the Treasury has focused upon this control aggregate, in order to deliver its objectives for the broader—but less directly controllable—GGE(X). The Control Total excludes cyclical social security, privatisation proceeds, central government debt interest and miscellaneous accounting adjustments. |
| **Departmental Resource Account (DRA)** | The accruals-based consolidated account for each department, prepared in conformity with the Resource Accounting Manual, scheduled to replace the Appropriation Account as from 2001–02. |
| **Executive agencies** | Launched in 1988 as the 'Next Steps' programme, much of central government activity is now conducted through executive agencies which are intended to have greater managerial autonomy. They are all self-accounting, and many have moved from cash to accruals in advance of their parent departments. Most are on-Vote (i.e. all their expenditure and income appears in the relevant Estimate line) but some have trading fund status (with only their external financing from the department being voted). In the national accounts, trading funds are treated as public corporations. |
| **General Fund** | In a department's accounts the balance on the General Fund represents its total assets less liabilities to the extent that it is not represented by other reserves. |
| **GGE(X)** | General Government Expenditure (GGE) is drawn from the national accounts which are prepared by the Office for National Statistics. However, as its macro-fiscal control target, the Treasury has focused for some years on a variant, known as GGE(X). This is defined as: GGE + privatisation proceeds − general government interest and dividend receipts − lottery expenditure. |
| **Non-Departmental Public Bodies (NDPBs)** | This is a heterogeneous category of government organisations, which the Cabinet Office categorises into three types: Executive etc., advisory and tribunals. |
| **Public Expenditure Survey (PES)** | The annual review of public expenditure plans, for three years ahead, which has been conducted on broadly comparable lines since the 1960s. However the incoming Labour government in May 1997 abolished the 1997 and 1998 PES rounds, substituting instead the Comprehensive Spending Review which fixed the new control aggregates for three years ahead. The first resource-based survey will be conducted in 2000, for the years 2001–02, 2002–03 and 2003–04. |
| **Resource Accounting** | The application of accruals accounting to central government; more specifically, the adoption of accounting standards as applicable to private sector companies, though subject to modifications devised by the Treasury in the light of particular circumstances in the central government sector. |
| **Resource Budgeting** | Resource Budgeting covers planning and controlling public expenditure on a resource accounting basis. |
| **Supply** | Money voted by Parliament annually on the basis of departments' estimates of payments and receipts likely to arise in the year, to meet the services shown in Estimates. Estimates are statements presented to the House of Commons of the estimated expenditure of departments which ask for the necessary funds to be voted. An individual Supply Estimate is called a Vote because the procedure by which Parliament authorises expenditure is to vote Supply. |
| **Total Managed Expenditure** | As from 1999–2000, there is a new control framework, albeit still on a cash basis. Total Managed Expenditure consists of Departmental Expenditure Limits (set firmly for three years ahead) and annually managed expenditure (whose composition is still reviewed annually). As from 2001–02, these aggregates will be recast in both resource and financing requirement (mostly cash) terms. |
| **UK generally accepted accounting practice (GAAP)** | The accounting and disclosure requirements of the Companies Act 1985 and pronouncements by the Accounting Standards Board (principally accounting standards and Urgent Issues Task Force abstracts), supplemented by accumulated professional judgement. |

# References

Australian Accounting Research Foundation (1993). *Financial Reporting by Government Departments*, AAS 29. Melbourne: Australian Accounting Research Foundation.

Accounting Standards Board (1992). *Financial Reporting Standard 2: Accounting for Subsidiary Undertakings*. London: Accounting Standards Board.

Accounting Standards Board (1995a). *Exposure Draft: Statement of Principles for Financial Reporting*. London: Accounting Standards Board.

Accounting Standards Board (1995b). *Financial Reporting Standard 5: Reporting the Substance of Transactions*. London: Accounting Standards Board.

Accounting Standards Board (1997). *Amendment to FRS 5—Exposure Draft: 'Reporting the Substance of Transactions: The Private Finance Initiative'*. London: Accounting Standards Board.

Accounting Standards Board (1998). *Amendment to FRS 5: 'Reporting the Substance of Transactions': Private Finance Initiative and Similar Contracts*. London: Accounting Standards Board.

Accounting Standards Committee (1978). *Statement of Standard Accounting Practice 14: Group Accounts*. London: Accounting Standards Committee.

Accounting Standards Committee (1990). *Proposed Statement of Standard Accounting Practice—Exposure Draft 50: Consolidated Accounts*. London: Accounting Standards Committee.

Barker, A. (ed.) (1982). *Quangos in Britain*. London: Macmillan.

Bichard, M. (1996). 'Answer to Question 13', in Public Accounts Committee, *Department for Education Appropriation Accounts (1994–95) Class X (Vote 6): The Financial Viability of the Teachers' Superannuation Scheme (England and Wales)*. Fifteenth Report of Session 1995–96, HC 158. London: HMSO.

Birkinshaw, P., Harden, I. and Lewis, N. (1990). *Government by Moonlight: The Hybrid Parts of the State*. London: Unwin Hyman.

Boulton, C. J. et al. (eds.) (1989). *Erskine May's Treatise on the Law, Privileges, Proceedings and Usage of Parliament*. London: Butterworths.

Bradley, A. W. and Ewing, K. D. (1997). *Constitutional and Administrative Law*. Twelfth edition. London: Longman.

Broadbent, J. and Laughlin, R. (1999). 'The Private Finance Initiative: clarification of a future research agenda'. *Financial Accountability & Management*, 15 (2): 95–114.

CIPFA (1995). *Memorandum to the Committee of Public Accounts on the Green Paper 'Better Accounting for Taxpayer's Money: Resource Accounting and Budgeting in Government'*. London: Chartered Institute of Public Finance and Accountancy.

Clarke, K. (1993). *Hansard*. 30 November, col. 931.

*Companies Act 1985*. Chapter 6. London: HMSO.

*Companies Act 1989*. Chapter 40. London: HMSO.

Comptroller & Auditor General (1996). *Highlands & Islands Enterprise Network Accounts 1995–96*. HC 663 of Session 1995–96. London: HMSO.

Deaton, D. (1996a). *National Accounts, the Definition of Public Expenditure and the Departmental Boundary*. Note for the Financial Reporting Advisory Board. London: HM Treasury, mimeo.

Deaton, D. (1996b). *Public Expenditure Control under Resource Accounting and Budgeting*. An Information Note for the Financial Reporting Advisory Board. London: Treasury, mimeo.

Dunsire, A. (1985). 'A cybernetic view of guidance, control and evaluation in the public sector', in Kaufmann, F. X. et al. (eds.), *Guidance, Control and Evaluation in the Public Sector*. Berlin: de Grutyer, 327–46.

Education and Employment Committee (1997). *The Dearing Report: Some Funding Issues*. Third Report of Session 1997–98. HC 241-I, II. London: Stationery Office.

Eurostat (1996). *European System of Accounts: ESA 1995*. Luxembourg: Office for Publications of the European Communities.

Financial Accounting Standards Board (1987). *Statement of Financial Accounting Standards No. 95: Consolidation of All Majority-Owned Subsidiaries*. Norwalk, Connecticut: Financial Accounting Standards Board.

Financial Accounting Standards Board (1991). *Consolidation Policy and Procedures*. Discussion Memorandum 107-A. Norwalk, Connecticut: Financial Accounting Standards Board.

Flinders, M. V. and Smith, M. J. (eds.) (1998). *The Politics of Quasi-Government: A Reform Agenda*. London: Macmillan.

Government Accounting Standards Board (1991). *Statement 14: The Financial Reporting Entity*. Government Accounting Standards Series. Norwalk, Connecticut: Government Accounting Standards Board.

Hawksworth, J. and Wilcox, S. (1995). *Challenging the Conventions: Public Borrowing Rules and Housing Investment*. Coventry: Chartered Institute of Housing.

Heald, D. A. (1995). 'Steering public expenditure with defective maps'. *Public Administration*, 73 (2): 213–40.

Heald, D. A. and Georgiou, G. (1995). 'Resource Accounting: valuation, consolidation and accounting regulation'. *Public Administration*, 73 (4): 571–79.

International Federation of Accountants—Public Sector Committee (1998). *Guideline for Government Financial Reporting: Exposure Draft Issued for Comment by 31 July 1998*. New York: International Federation of Accountants.

Inter-Secretariat Working Group on National Accounts (1993). *System of National Accounts 1993*. Brussels: Commission of the European Communities et al.

Jones, R. H. and Lüder, K. G. (1996). 'The relationship between national accounting and governmental accounting: state of the art and comparative perspectives'. *Research in Governmental and Nonprofit Accounting*, 9: 59–78.

Jordan, G. (1994). *The British Administrative System: Principles Versus Practice*. London: Routledge.

Likierman, A. (1995). 'Resource Accounting and Budgeting: rationale and background'. *Public Administration*, 73 (4): 562–70.

Likierman, A. (1996). 'The UK government's accounting and budgeting revolution'. *Research in Governmental and Nonprofit Accounting*, 9: 303–22.

Limon, D., McKay, W. R. et al. (eds.) (1997). *Erskine May's Treatise on the Law, Privileges, Proceedings and Usage of Parliament*. London: Butterworths.

Livingston, K. (1997). *The PFI and Student Residences*. MA (Honours) Dissertation, University of Aberdeen.

Local Government (Scotland) Act 1994. Chapter 39. London: HMSO.

Lüder, K. G. (1988). *Harmonisation of Governmental Accounting and Financial Reporting*. Speyerer Arbeitshefte 85. Speyer.

McLean, I. and Clifford, C. (1996). *The Quest for a Taxonomy of Government Organisations*. Oxford: Nuffield College, mimeo.

Mian, S. L. and Smith, C. W. (1990). 'Incentives for unconsolidated financial reporting'. *Journal of Accounting and Economics*, 12: 141–71.

Moonitz, M. (1951). *The Entity Theory of Consolidated Statements*. Brooklyn: Foundation Press.

National Audit Office (1996). *Resource Accounting and Budgeting in Government: the White Paper Proposals*. HC 334 of Session 1995–96. London: HMSO.

OECD (1993). *Accounting for What? The Value of Accrual Accounting in the Public Sector*. Occasional Papers on Public Management. Paris: OECD.

Office for National Statistics (1997). 'Government deficit and debt under the Maastricht Treaty'. *ONS (97) 236: 29 August*. London: Office for National Statistics.

Office of the Auditor General of Canada and United States General Accounting Office (1986). *Federal Government Reporting Study*. Ottawa and Washington, D.C.

Parker, R. H. (1977). 'Concepts of consolidation in the EEC'. *Accountancy*, 88 (1002): 72–75.

Power, M. and Laughlin, R. (1992). 'Critical theory and accounting', in Alveson, N. and Willmott, H. (eds.), *Critical Management Studies*, 113–35. London: Sage.

Public Accounts Committee (1995). *Resource Accounting and Budgeting in Government*. Fifteenth Report of Session 1994–95. HC 407. London: HMSO.

Public Accounts Committee (1996). *Department for Education Appropriation Accounts (1994–95) Class X (Vote 5): The Financial Viability of the Teachers' Superannuation Scheme*. Fifteenth Report of Session 1995–96. HC 156. London: HMSO.

Radcliffe, R., Hawksworth, J. and Glanville, J. (1996). *Consensus for Change: Public Borrowing Rules, Housing and the City*. Report by Coopers & Lybrand. Coventry: Chartered Institute of Housing.

Sizer, J. (1992). 'Can a funding council be a proxy for price competition in a competitive market?' *Higher Education Policy*, 5 (3): 27–29.

Scottish Office (1992). *Direction given by the Secretary of State for Scotland—Highlands & Islands Enterprise: Accounts Direction 1991–92*. Edinburgh: Scottish Office, mimeo.

Scottish Office (1996). 'Direction given by the Secretary of State for Scotland—Highlands & Islands Enterprise: Accounts Direction 1995–96', in Comptroller and Auditor General, *Highlands & Islands Enterprise Network Accounts 1995–96*. HC 663 of Session 1995–96. London: HMSO.

Taylor, P. (1996). *Consolidated Financial Statements*. Revised edition. London: Paul Chapman.

Thain, C. and Wright, M. (1995). *The Treasury and Whitehall: The Planning and Control of Public Expenditure, 1976–1993*. Oxford: Clarendon Press.

Treasury (1994). *Better Accounting for the Taxpayer's Money: Resource Accounting and Budgeting in Government*. Cm 2626. London: HMSO.

Treasury (1995a). *Better Accounting for the Taxpayer's Money: The Government's Proposals*. Cm 2929. London: HMSO.

Treasury (1995b). *Treasury Minute on the 15th and 18th to 25th Reports of the Committee of Public Accounts of Session 1994–95*. Cm 2990. London: HMSO.

Treasury (1996). 'Resource Accounting and Budgeting: progress since the July 1995 White Paper and possible developments in a resource-based system of Supply and reporting to Parliament', in Treasury Committee, *Resource Accounting and Budgeting*, Second Report of Session 1996–97, 1–22. HC 186. London: Stationery Office.

Treasury (1997). *PFI Technical Note No. 1: How to Account for PFI Transactions*. Private Finance Taskforce.

Treasury (1998a). *The Code for Fiscal Stability*. Pre-Budget Report Publications. London: HM Treasury.

Treasury (1998b). *Resource Accounting Manual*. London: Stationery Office.

Treasury (1998c). *Stability and Investment for the Long Term: Economic and Fiscal Strategy Report 1998*. Cm 3978. London: Stationery Office.

Treasury (1998d). *Whole of Government Accounts*. London: HM Treasury.

Walker, R. G. (1976). 'An evaluation of the information conveyed by consolidated statements'. *Abacus*, 12 (2): 77–115.

Walker, R. G. (1995). *Public Sector Consolidated Financial Statements*. Working paper series, School of Accounting. Sydney: University of New South Wales.

Wirth, W. (1985). 'Control in public administration, plurality, selectivity and redundancy', in Kaufmann, F. X. et al. (eds.). *Guidance, Control and Evaluation in the Public Sector*, 595–624. Berlin: de Gruyter.

# Book Reviews

**Tax and Optimal Capital Budgeting Decisions.** *Susan Farrar.* Ashgate Publishing (Aldershot), 1999. xi + 299 pp.

I was interested to receive a copy of this book, which is based on Susan Farrar's PhD dissertation, since it is almost 20 years to the day that I submitted my own PhD dissertation in a very similar area. *Tax and Optimal Capital Budgeting Decisions* focuses on a linear programming approach to determining optimal investment and financing decisions in the face of the complexities of the UK tax system. My own dissertation was concerned with the general use of linear programming for the joint investment and financing decision, though my modelling of taxation was fairly primitive. As a result of my own work, I came to the conclusion that linear programming for the joint investment and financing decision was doomed to failure as a working tool. Essentially, discounting methodologies classified projects on economic criteria into good, poor and marginal. Linear programming merely refined marginal decisions about marginal projects at the cost of imposing an artificially rigid format into the planning decision. Thus I was interested to see what progress had been made in the intervening years, and whether the complexities of the UK tax system necessitated the use of formal optimisation procedures such as provided by linear programming.

The book itself follows the linear and formal structure of a doctoral dissertation, with relatively minimal concessions made to 'popularising' the ideas. Following a brief introduction, the next four chapters are essentially a review of the existing literature in related areas. Chapters six and seven present the contribution to the area, with chapter six presenting the model as developed by the author and chapter seven the results of running the model. Chapter eight presents a brief (four-page) review of the contribution. The book is supported by appendices, mainly detailing the programming code written for the commercial mathematical programming package XPRESS-MP that was used for building the model. There is an extensive and eclectic set of references but no index.

Returning to the earlier chapters, chapter two is a review of some of the ways the intricacies of the tax system influence investment decisions. Thus, after a discussion of the impact of capital allowances we are treated to a review of tapering relief for small companies, the impact of ACT on dividend policy and a detailed discussion of the general impact of surplus ACT. Provisions for transfer of losses between members of groups are illustrated by simple examples. Chapter three is a fairly brief review of investment appraisal techniques in theory and of the practice as identified in surveys by different authors. The fourth chapter looks at taxation and corporate financial policy, the impact of taxation on the cost of capital and the leasing decision. Chapter five is a historical, as opposed to analytical, review of work in the area of linear programming and financial planning. It essentially defines the niche into which the current thesis fits—that of a model which incorporates the complexities of corporate taxation. Although these chapters are apposite to the subsequent development of the model and identify the context of the work, they do not in themselves offer new insights.

Chapter six describes the detailed structure of the mathematical programming model. The chapter focuses on the structure of constraints that model mutual exclusivity, tapering relief for small companies and losses carried backwards or forwards and provisions for group relief. The objective function is the simple economic criterion of the value of the firm as represented by the present value of dividends.

Chapter seven explores the results of running the model with restrictions on corporate financing policy such as the debt equity rate and dividend growth. The impact of specific tax effects, such as unutilized ACT offset capacity and group election for ACT payments are also explored. An attempt is made to incorporate uncertainty by an iterative procedure involving a three-state CAPM. While the complexity of the analysis and the challenge of modelling justify the doctoral award, the book is not going to have a wide appeal. Doctoral theses seldom do. It is essentially a book for those who want to examine the use of optimising models of the joint investment and financing decision. It should also provide useful insights for those who prefer to adopt a spreadsheet approach to the modelling of complex tax situations. The question arises whether this work convinces me that such models now offer a viable methodology for the solution of the joint problem of investment and financing strategies. My own view remains unchanged. Linear programming copes badly with data uncertainty. Non-programmed searches for strategies using spreadsheets still provide a more viable option for exploring investment and financing decisions, even in the face of the very real complexities of the UK tax system.

University of Bristol David Ashton

**Management Buy-outs and Venture Capital—Into the Next Millennium.** Edited by *Mike Wright* and *Ken Robbie*. Edward Elgar, Cheltenham, 1999, xiv + 354 pp. £69.95.

The Centre for Management Buy-Out Research at the University of Nottingham Business School, of which Mike Wright is the Director and Ken Robbie Deputy Director, is well known for its role in monitoring trends in the management buy-out sector, and wide ranging research into many facets of the venture capital industry. This book is a compilation of academic papers presented at a symposium to celebrate the 10th anniversary of the centre, and its declared aim is to 'analyse the prospects for MBOs and venture capital into the next millennium'. The text comprises a total of 14 different academic papers which span a whole range of topics from generic characteristics of the UK venture capital industry, through relationship banking, to the consequences of venture capital investment on accounting information systems. The breadth of coverage makes the book very useful for academics interested in the detail of research trends in the field, as well as those seeking a broader understanding of the issues pertinent in the venture capital industry. In this regard also, the book provides a useful basis for selective referencing of readings for a final year undergraduate/post-graduate corporate finance course. In particular Chapter 3, authored by the text's editors, offers an up-to-date review of sources of funding, patterns of investment, rates of return and exit routes for venture capitalists in the UK and European markets.

A further strength of the book is the way in which the editors suggest that academic research in the field can be categorised as addressing either industry/market level topics, and firm level topics. They note that, to date, little work has been done which links the two levels of industry and firm, and suggest a number of areas for future research, which include study of the cost of the information search by venture capitalists, the use of performance related contracts, e.g. equity ratchets, and the development and testing of bargaining models for investment contracts.

The book may be criticised, however, for the minimalist editing which seems to have taken place, which in my opinion has resulted in some of the great potential of such a book remaining unexplored. Some individual papers raise important issues, or express views which directly conflict with those of other authors in the book, but the editors have failed to include text which explicitly links papers, and they do not initiate any form of critical debate on contested issues. One example of where editors' intervention in this way might have been useful relates to the topic of realisation of a venture capital investment via an initial public offering (IPO) or trade sale. The introductory chapter by Wright and Robbie includes brief discussion of the research evidence on the issues associated with investment realisation. This is complemented by detailed evidence in the Bygrave and Timmons paper (Chapter 2) on IPO trends in the US 1990–1995, brief comment on IPOs in eastern Europe in Chapter 4, and further detailed discussion of the performance of European IPO markets by Leleux and Muzyka in Chapter 13. At no point, however, do the editors draw the reader's attention to the variety of comments on IPOs; they are discovered only if all of the papers are read in full. The book would, I believe, have benefited from the adoption of a more topic-based grouping of the chosen papers, with editorial comment on the core issues associated with that topic.

Editorial comment would also have been useful in relation to some of the opposing views which are scattered throughout the book. For example, Bygrave and Timmons (p. 55) forecast that for the year 2000 and beyond 'there will be even more emphasis on classic venture capital in all industrial nations'. 'Classic' in this context refers to investment in early stage ventures, as opposed to 'merchant' capital, which denotes investment in more mature companies and MBOs. Evidence from the EVCA, quoted in Chapter 1, points in precisely the opposite direction, with only 6.5% (by annual value) of European venture capital investments in early stage and start-ups, and comment by the authors that the focus of attention is shifting in favour of investing in restructuring, including MBOs and buy-ins, rather than start-ups. These differences of opinion between the US and European perspectives on the industry could have been a useful starting point for a debate on the worldwide uniformity/lack of uniformity of trends in the venture capital industry.

In conclusion, this collection of papers provides a useful source of information on recent research findings in relation to venture capital and management buy-outs, but it is primarily a book for library rather than personal purchase. The breadth of coverage means that few individual researchers would be able to make full use of the entire text, indeed some of the papers might be criticised for being 'fringe'. Chapter 8 on trade credit is one such example. The high price tag also limits the personal market for the book. Nonetheless, I would strongly recommend its addition to the reading list of corporate finance courses which include study of the venture capital industry.

Loughborough University Margaret Woods

**Financial Reporting & Analysis.** *Lawrence Revsine, Daniel W. Collins and W. Bruce Johnson.* Prentice Hall, New Jersey, 1999. xviii + 988pp.

As might be expected from these authors and publisher, this is a clearly thought-out and well presented book that should be considered by anyone preparing an intermediate-level course in financial reporting.

In the introductory material, Lawrence Revsine states:

> 'Our objective in writing this book was to change the way that the second course in financial reporting is taught. Typically this course...focuses on just the details of GAAP and the accounting process. In contrast, our book provides instructions with an opportunity to present the 'big picture' without sacrificing technical underpinnings.'

Such claims can hardly be thought modest and may, at least in part, be questioned—but are largely justified by the content of the book and its manner of presentation.

One issue to be disposed of immediately is the use of the term '& Analysis' in the title. One might be led by this to believe the focus is on financial analysts but is soon disabused of this. On p. 12, the reader is told:

> '...we define **analyst** broadly to include investors, creditors, financial advisors, and auditors—anyone who uses financial statements to make decisions as part of his or her job.'

A sceptic may suggest that this broad definition merely enables RCJ to write yet another intermediate-level text, but this would be to do the authors an injustice. Indeed, as Revsine himself explains:

> 'In one respect, our book is very traditional. All the familiar topics are there....But what's different about this book is that we have some unique chapters and do some unique things in the more traditional chapters.'

Among the 'familiar' topics are Receivables, Inventories, Long-Lived Assets, Financial Instruments, Leases, Deferred Tax, Pensions, Inter-corporate Equity Investments and Cash Flow Statements. However, Revsine is correct in believing it is the framing chapters, which illuminate much of the book's treatment of the familiar topics, that are of particular interest. He highlights Chapters 1, 5 and 6. These examine, respectively, the economic and institutional setting for financial reporting, the role of financial information in valuation, cash flow analysis and credit risk assessment, and the role of financial information in contracting. Although the coverage of none of these is unique (outside the US context, at least), e.g. Taylor and Turley (1986) on the first of these, Whittred and Zimmer (1992) on the last, it is unusual to find such material integrated into an intermediate level text.

While anyone teaching financial reporting at this level who wishes not simply to 'grind their way through the standards' will already be using journal articles to incorporate such material into their course, it is refreshing to find much of it included, to an appropriate level, in 'the main text'.

Many other strengths are noteworthy. Within topics, explanations of complexities are pellucid, thus facilitating ready comprehension. (The Quaker Oats case in Chapter 4 is worthy of individual note, being a nicely written and thorough case on Financial Statement Analysis.) As might be expected of an American book, 'production values' are strong: the layout is excellent and imaginative use is made of colour, 'explanation boxes' within the text, and diagrams. Each chapter ends with a wide selection of exercises, problems and cases, focussed on the issues covered in the chapter. (This is a far cry from the lamentable practice, evident in many British books, of providing just three or four unfocussed questions of the 'Institute of Cost and Turf Accountants, Level 3, 1987' type.) The accompanying *Solutions Manual* has 803 pages!

Weaknesses? There are some minor errors in the *Solutions Manual,* apparently stemming from question updating not being carried through when framing the answers. Although mostly unimportant, at least one is capable of leading students away from a correct solution. In addition, the separate *Instructor's Manual* contains masters for many OHP slides, including the well-designed diagrams, but not those for many of the tables included in the text. Although these can be produced quickly on a spreadsheet, it is tiresome to have to do so. (The supporting PHLIP WWW site may contain support of this sort, but my early attempts to gain a password for this met with no response. Recent contact with the publishers indicated that communications may be improving, but so far I have not received a password.)

A final point is a criticism not only of this book but also of most intermediate-level books on financial reporting. From a British (and possibly, more generally, a non-US) teacher's point-of-view, the almost completely US-centric viewpoint of the book (most references and discussions are limited to US GAAP), while normally not overly intrusive, can on occasion annoy. For example, almost 60% of the chapter on inventories is on various aspects of LIFO, while the weighted average method gets only a brief mention. Similarly, Chapter 12 on 'Income Tax Reporting' restricts its coverage of deferred tax to the basics of the subject, the liability method and then SFAS109. No mention is made of partial provisioning, which, although its days are numbered, opens up interesting discussion points. Not even the inclusion of a final chapter considering international differences disguises the general parochialism of the book. Feedback from a multinational student class indicated that this aspect was one of their few criticisms of the book.

Undoubtedly American readers would find similar criticisms to make of British (and other) texts. However, at a time when professional accounting organisations such as the ICAEW, ACCA and AICPA are seeking to become global bodies, and there is even the (admittedly faint) possibility of one set of financial reporting standards being used worldwide, producing a new text so strongly focussed on one regulatory environment seems curiously outdated. Tim Sutton's recent (2000) IAS-based book is a step in the right direction.

Perhaps even more importantly, a country-specific approach leads to a focus, particularly in the minds of the students using the book but also in some of the explanations provided—on the rules laid down, not on the underlying issues and debates. If, as teachers, we aspire to the nurturing of an analytical approach to the material we cover, the detail of the resolution of debates, in the form of the reporting standards issued, is secondary to a thorough appreciation of the fundamental issues themselves.

The US-centric viewpoint will dissuade many non-US teachers from adopting the book. This is a pity, as its combination of interesting topic coverage, clear explanations of technical issues and well-motivated considerations of policy choice result in a stimulating basis for a course (this being very strongly reflected in student feedback). Although (as noted) the last chapter does give some coverage of international differences, a truly international, non-country-specific edition would be welcome.

## References

Sutton, Tim (2000). *Corporate Financial Accounting and Reporting. Financial Times*—Prentice Hall.

Taylor, Peter and Turley, Stuart (1986). *The Regulation of Accounting.* Blackwell.

Whittred, Greg and Zimmer, Ian (1992). *Financial Accounting: Incentive Effects and Economic Consequences.* Holt, Rinehart & Winston.

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### *General*

Papers should be in English and consist of original unpublished work not currently being considered for publication elsewhere. They should be typed and double-spaced. *Four* copies should be submitted, together with a submission fee of £18 for subscribers or £36 for non-subscribers. In order to ensure an anonymous review, authors should not identify themselves, directly or indirectly. Experience has shown that papers that have already benefited from critical comment from colleagues at seminars or at conferences have a much better chance of acceptance. Where the research takes the form of field surveys or experiments, *four* copies of the instrument should be submitted. Where the paper shares data with another paper, *four* copies of the other paper must also be provided.

### *Presentation*

A cover page should show the title of the paper, the author's name, title and affiliation, and any acknowledgements. The title of the paper, but not the author's name, should appear on the first page of the text. An abstract of 150–250 words should be provided on a separate page immediately preceding the text. Section headings should be numbered using Arabic numerals.

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Each table and figure should bear an Arabic number and a title and should be referred to in the text. Sources should be clearly stated. Sufficient details should be provided in the heading and body of each table and figure to reduce to a minimum the need for cross-referencing by readers to other parts of the manuscript. Tables and figures should appear at the end of the paper, with its most appropriate placing noted in the paper itself. Diagrams and charts should be submitted in camera-ready form.

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Accounting Standards Steering Committee (1975). *The Corporate Report.* London: ASC.
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Watts, R. L. and Zimmerman, J. L. (1986). *Positive Accounting Theory.* Englewood Cliffs, NJ: Prentice-Hall.

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Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelled with an 's' not a 'z'. Single quotations marks should be used, not double.

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Mathematical notation should be used only where it adds rigour and precision, and should be properly explained in the text. Equations should be numbered in parentheses, flush with the right-hand margin.

Commerce
22/8/2000

# Accounting and Business Research

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# An empirical examination of forecast disclosure by bidding companies

**Niamh Brennan***

**Abstract**—This paper examines voluntary disclosure of profit forecasts by bidding companies during takeovers. Disclosure is examined from two perspectives: (i) factors influencing disclosure and (ii) the influence of good news and bad news on disclosure. Takeover documents published during 701 takeover bids for public companies listed on the London Stock Exchange in the period 1988 to 1992 were examined. Two variables accounted for almost all the influences on disclosure of forecasts: bid horizon and type of bid. Probability of forecast disclosure was greater the shorter the bid horizon and during contested bids. In addition, there was some evidence that the nature of the purchase consideration offered by the bidder (cash or paper) and the industry of the bidder influenced disclosure. Disclosure was significantly more likely in paper bids and in the durable goods industry. Forecasts were more likely to be disclosed when firms had good news to report.

## 1. Introduction

Studies of the behaviour of bidding companies and their management include examination of bidder motives for acquisitions and the influence of bidding company managerial wealth effects on takeovers. This paper extends the research of bidding company behaviour to disclosure decisions taken during takeovers. Factors that help explain bidding company decisions to publish profit forecasts are analysed.

Many US analytical and empirical studies of disclosure of annual earnings forecasts have focused on the influence on disclosure of the news content of forecasts. Evidence in the US has been mixed. This research examines whether managers are motivated to signal good news about superior prospects by disclosing profit forecasts.

Forecasts are rarely disclosed in the UK except in new share issue prospectuses and during takeover bids. Previous UK studies, by and large, have considered the topic of profit forecasts disclosed during takeover bids (Carmichael, 1973; Dev and Webb, 1972; Westwick, 1972) and in new issue prospectuses (Ferris, 1975 and 1976; Keasey and McGuinness, 1991; Firth and Smith, 1992) from the standpoint of accuracy of, and bias in, the forecasts. Studies of users' needs have shown forecast information to be one of the most important financial disclosures a company can make (Courtis, 1992). Given the perceived importance of forecasts, it is surprising that more research in the UK has not been devoted to examining their disclosure.

### *1.1. Regulation of takeovers in the UK*

Regulation of takeovers of public companies in the UK is primarily governed by *The City Code on Takeovers and Mergers* (Panel on Takeovers and Mergers, 1993), by *The Listing Rules* (London Stock Exchange, 1997) and, to a lesser extent, by the Companies Act 1985 (Great Britain, 1985). These regulations are briefly summarised in Sudarsanam (1995).

Public companies quoted on the London Stock Exchange may be acquired by the purchase of shares on the Stock Exchange (uncommon because of legal regulations, and because *The City Code on Takeovers and Mergers* requires a compulsory offer once 30% of shares are acquired) or by an offer to shareholders for all or part of the target's share capital. Offers to shareholders may be with the agreement of the target's management (agreed bids) or may be hostile bids.

Takeover bids in the UK may be categorised into three groups:

- Agreed or friendly bids—offers to shareholders made with the agreement of the target's management.

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- Hostile bids—where the target company management indicate disagreement with the terms of the bid (e.g. that the price offered is too low).
- Competing bids—these are bids where more than one bidder competes for the target. Some of these bids may be with the agreement of target management (white knight bids) or may be hostile bids.

The term 'contested' is defined in this paper as including both hostile and competing bids.

Neither the London Stock Exchange nor the Panel on Takeovers and Mergers compels directors to make a profit forecast, with one exception: any disclosure before a takeover bid, of financial information relating to unaudited results, is deemed under the City Code to amount to a forecast and must be included as a formal profit forecast in the bid documentation. This might happen, for example, in informal briefing sessions between company management and financial analysts. Thus, most forecasts are made voluntarily, but some are included involuntarily in takeover documents.

All forecasts (both voluntary and involuntary) must be reported on in the UK by independent accountants and the company's financial advisors (except for forecasts made by bidders offering cash). The accountants must satisfy themselves that the forecast, so far as the accounting policies and calculations are concerned, has been properly compiled on the basis of assumptions disclosed.

### *1.2. Motivations for disclosure*

Forecasts are normally made during takeover bids to support arguments being put forward by directors. These forecasts are included in offer documents sent by the bidding company to its shareholders and to target company shareholders. Thus, there is a much wider audience for these disclosures than for disclosures made in more routine circumstances.

There are at least three reasons why bidding company directors would disclose a forecast:

- To support the price of shares being offered to target shareholders as consideration for the target.
- To support the price of new shares issued to bidding company shareholders to raise cash to acquire the target.
- To persuade target shareholders that bidding company management will run the company better than current management.

## 2. Prior research

### *2.1. Factors influencing disclosure*

Prior research suggests that a number of factors are related to disclosure of forecasts.

•*Type of bid*

The type of bid may influence the propensity of firms to disclose information. There is evidence from Gray, Roberts and Gordon (1991) that more forecasts are voluntarily disclosed during contested bids. Contested bids are characterised by attacks on the performance of management. Such attacks are common when management does not disclose a forecast to support its claims of good performance. More forecasts are expected, therefore, in contested bids.

•*Bid horizon*

The primary motivation for bidders to disclose forecasts is to support the price of any shares issued during the takeover. However, there is risk associated with forecast disclosure. It is not clear which is more important—keeping shareholders informed about results or avoiding the risk of the forecast not being achieved.

It is likely that the closer a company is to its year end, the longer it will have been since it last reported results to shareholders, and the greater the need to disclose a forecast to inform shareholders about company performance. Equally, companies prefer to make forecasts close to the year end as this reduces the risk of getting the forecast wrong. Evidence from the US suggests that the frequency of forecasts increases as the end of the reporting period approaches (McNichols, 1989). Thus, forecasts are expected to be disclosed the shorter the bid horizon (i.e. the shorter the period between making the forecast and the forecast period end).

•*Purchase consideration*

Purchase consideration ranges from cash to paper to a mixture of both. Previous research has shown purchase consideration to influence takeover bids. Carleton et al., (1983) argue that cash takeovers and security exchange mergers may be motivated by different considerations. Franks, Harris and Mayer (1988) and Travlos (1987) find evidence that when shares (rather than cash) are used to finance takeovers, there are negative returns to acquirers. Berkovitch and Narayanan (1990), Eckbo, Giammarino and Heinkel (1990) and Fishman (1989) show that, when there is information asymmetry between bidder and target, high synergy bidders use cash and low synergy bidders use shares to finance the takeover.

From a bidder's point of view, one of the main reasons for disclosing a forecast is to add credibility to the value of the shares being issued in consideration for the target. If the consideration is cash, a forecast by bidders may not be as relevant. Bidders' average share prices fall at the announcement of bids (Limmack, 1991) hence, even in cash bids, a forecast is potentially useful. Also, legal considerations may prompt disclosure of forecasts by bidders. In summary, forecasts are expected to be disclosed by bidders primarily during paper bids.

•*Management ownership*

Agency theory posits that firms will voluntarily disclose information to reduce agency costs. The degree of conflict between managers and shareholders is predicted to increase inversely with managers' ownership share (Jensen and Meckling, 1976). Therefore, as managers' ownership share falls, monitoring and bonding costs will increase. Firms with lower percentage management ownership will require a higher level of monitoring, and are therefore more likely to disclose forecasts.

Ruland, Tung and George (1990) tested agency theory in the context of the voluntary disclosure of earnings forecasts. They found management ownership to be significantly lower for forecast disclosing firms.

•*Large block shareholdings*

Firms with higher concentrations of large shareholders are more likely to be able to communicate information to shareholders privately. Consequently, firms with a larger proportion of share capital concentrated amongst a few large shareholders are likely to find disclosure of such private information easier than firms with more dispersed shareholdings, and so can avoid public disclosure of information. Schipper (1981: 86) argues this point from an agency perspective by stating 'monitoring problems that could be solved by issuing public accounting reports would be increasing in the number of owners...'. Thus, firms with larger proportions of their share capital held by larger shareholders are less likely to disclose forecasts.

•*Size of firm*

Size proxies for many variables. As Ball and Foster (1982) point out, results confirming a size hypothesis may have alternative explanations. Care must be taken in interpreting the results of tests including this variable.

In early research of differences between forecasting and nonforecasting firms, firms were found to differ most on size and earnings variability. Ruland (1979), Cox (1985), Waymire (1985), Lev and Penman (1990) and Clarkson, Kao and Richardson (1994) found forecasting firms to be systematically larger than nonforecasting firms. Economies of scale in disclosure and litigation deterrence (larger firms are more exposed to litigation as they are seen to have 'deeper pockets') are two reasons put forward by Kasznik and Lev (1995) explaining why size might be related to disclosure. They found firm size to be a significant explanatory variable of the likelihood of discretionary disclosure for good news and bad news firms.

Another possible explanation relating size to disclosure is that large firms have a greater need for disclosure as their shares are more widely traded. Leftwich, Watts and Zimmerman (1981) and Bradbury (1992) included size to proxy for agency costs of capital held by outsiders on the assumption that the proportion of outside capital tends to be higher for larger firms.

There are various other reasons why size might be related to disclosure. It is less costly for larger companies, with more sophisticated accounting and forecasting systems, to disclose forecasts. The cost of assembling the information is greater for small firms than large firms (Securities and Exchange Commission, 1977). This is particularly likely in the context of publishing a formal profit forecast (within the fairly tight time constraints of a takeover bid), which would need reliable forecasting systems.

Larger bidders are expected to be more likely to disclose forecasts.

•*Listing status*

Listing status has been found to be related to voluntary disclosure, with listed firms disclosing more than unlisted firms (Leftwich, Watts and Zimmerman, 1981; Cooke, 1992; Malone, Fries and Jones, 1993). The bidding firms in this research range from individuals, consortiums of individuals, private companies to foreign listed companies so listing status needs to be controlled for.

•*Industry*

Industry is predicted to be related to disclosure for a number of reasons. Different industries have different proprietary costs of disclosure. Also, profits in some industries are easier to forecast than in others. Industry membership has been found to be related to the accuracy of forecasts disclosed (Jaggi, 1978). Consequently, control for the effect of industry is necessary.

•*Nationality*

Many of the bidders are foreign. International accounting research has documented differences in disclosure practices by firms from different countries (Biddle and Saudagaran, 1989; Frost and Pownall, 1994). This variable also needs to be controlled for.

To summarise, the variables hypothesised to influence forecast disclosure by bidders, and the model tested in this research, is as follows:

Forecast disclosure =

*f* (Type of bid, Bid horizon, Purchase consideration, Management ownership, Large block shareholdings,
Size of firm, Listing status, Industry and Nationality)

### 2.2. *News in forecasts*

Economic theory suggests that, in the absence of mandatory disclosure, firms will disclose information to the extent that marginal benefits will be greater than the costs of disclosure. The main benefit of disclosure is enhancement of firm value in terms of increased share price. Milgrom (1981) introduces a notion of 'favourableness' of news and shows, *(inter alia)*, that the arrival of good news about a firm's prospects always causes the share price to rise. Signalling theory suggests that firms are motivated to signal good news and such firms are more likely to disclose a forecast.

#### •*Expectations adjustment hypothesis*

The expectations adjustment hypothesis of Ajinkya and Gift (1984) is that managers disclose forecasts to change investors' expectations of future earnings. This suggests that managers have incentives to disclose both favourable and adverse forecasts. They compare management forecasts with analysts' forecasts prevailing just prior to the release of the management forecast (as surrogates for market expectations). Their results support the hypothesis that forecasts occur in cases in which good news and bad news adjustments are called for, and the market responds symmetrically to the direction and magnitude of these forecast signals. Ruland, Tung and George (1990) found that managers' forecasts tend to confirm rather than correct analysts' forecasts.

Skinner (1994) finds in his classification of disclosure announcements that approximately 5% of observations fall into the no news category. This, he comments, is consistent with the view that managers disclose information to change earnings expectations. Whereas Ajinkya and Gift (1984) only considered point and narrowly defined range forecasts, Skinner's findings are based on varied types of forecast, including qualitative forecasts.

#### •*Good news/bad news*

Empirical evidence on the role of good news in motivating forecast disclosure is mixed. Patell (1976), Penman (1980) and Lev and Penman (1990) find that earnings forecasts are in general associated with positive returns, and that firms with good news appear more willing to reveal their forecasts. The latter also find, consistent with their signalling hypothesis, that firms with good news voluntarily release forecasts in order to distinguish themselves from firms with worse news. As there were several bad news forecasts in the samples, there must be some incentives for management to publish these forecasts even though they result in downward revaluation. Thus, while firms typically publish earnings forecasts when they have good news, this is not always so.

Research based on later time periods indicates that firms are as likely to issue good news forecasts as bad news forecasts. Ajinkya and Gift (1984), Waymire (1984) and Ruland, Tung and George (1990) did not observe an overall tendency to report good news. They show that incentives exist for management to disclose both good and bad news. Baginski, Hassell and Waymire (1994), Pownall, Wasley and Waymire (1993) and Skinner (1994) provide evidence that firms are more likely to disclose bad news than good news. Clarkson et al., (1992) and Clarkson, Kao and Richardson (1994) found that the mean value of the good news measure for Canadian forecasters significantly exceeded nonforecasters. However, when financial market and product market considerations are included, Clarkson, Kao and Richardson (1994) find, consistent with more recent US literature, that the good news hypothesis offers only partial explanation for the decision to forecast.

As the weight of evidence supports the disclosure of good news, it is hypothesised that more good news than bad news forecasts will be disclosed.

One explanation for the variations in US findings is that most studies examine only point and range forecasts of annual earnings (e.g. Penman, 1980; Ajinkya and Gift, 1984; Waymire, 1984; McNichols, 1989; Pownall and Waymire, 1989) or very quantitative forecasts (e.g. Patell, 1976). Lev and Penman (1990) and Skinner (1994) consider point and range forecasts and, in addition, open ended (i.e. bounded from either above (upper-bound) or below (lower-bound)) and qualitative forecasts. Similarly, Baginski, Hassell and Waymire (1994) consider minimum, maximum and 'general impression' estimates as well as point and range estimates. Pownall, Wasley and Waymire (1993) find no significant differences in stock returns for different forecast types, although point forecasts were associated with more positive and more significant returns. Point and range forecasts comprised less than 20% of their sample.

This paper examines whether forecast disclosure was motivated by good news and whether good news or bad news forecasts were disclosed. Signalling good news and the news content of forecasts is likely to have greater economic consequences during takeover bids than in routine disclosure situations (such as annual forecast disclosures) examined by other researchers. The study includes qualitative as well as quantitative upper/lower bounded, point and range forecasts.

## 3. Data and methodology

### *3.1. Population and selection of sample*

The sample chosen for study covers all takeover bids for companies listed on the London Stock Exchange during the period 1988 to 1992.

*Acquisitions Monthly* was used to obtain a list of all public company takeovers in the UK over the five-year period of the study. In total, 705 completed and failed bids were listed for 1988 to 1992. Four bids listed by *Acquisitions Monthly* were excluded: two bids, occurring in late December, were included twice in two different years by *Acquisitions Monthly*; in one further case, the target had previously been taken over by a public company and was therefore a private company at the date of the second bid—takeover documents were not publicly available for the bid; the fourth bid excluded did not take place, even though it was reported as a takeover by *Acquisitions Monthly*. The resulting full population of 701 bids is included in this study.

Takeover bids are analysed by type in Table 1. There were 477 agreed bids, 160 hostile bids, 49 competing bids (more than one bidder) and 15 white knight bids. For the ensuing analysis, hostile, competing and white knight bids are categorised as contested. In total, therefore, there were 224 contested bids in the sample.

### *3.2. Data collection*

Forecasts were obtained from an examination of takeover documents for the entire sample of 701 bids. *Extel Financial's* microfiche service contains microfiche copies of all documents issued by companies quoted on the London Stock Exchange. Any remaining missing documents were obtained by writing directly to bidders or their financial advisors.

### *3.3. Measurement of variables*

The dependent variable is voluntary forecast disclosure (F) with a value of 0 for nondisclosure, or for disclosure of involuntary/repeat forecasts, and 1 where one or more forecasts are voluntarily disclosed.

Type of bid (BID) is given a value of 0 for agreed bids and 1 for contested bids which include hostile, competing and white knight bids. Bid horizon (BHOR) measures the closeness of the bid date to the year end of the bidder. BHOR is measured in days from the date of the bid to the accounts year end date for which accounts have not yet been published.[1] *Acquisitions Monthly* discloses the date of the most recent published accounts. This variable is scaled by the number of days in the year (365).

Because the date of takeover bids can be ascertained, BHOR can be measured and compared for forecasters and non-forecasters. Previous research, based on routine disclosures, has only been able to measure forecast horizon (Waymire, 1985; McNichols, 1989). As this cannot be calculated for non-forecasters, the horizon for forecasters and non-forecasters has not been compared in most prior research.

Purchase consideration (CON) is coded 1 for cash, 2 for paper and 3 for various combinations of cash and paper. Data on all these variables were obtained from *Acquisitions Monthly* or from the takeover documents.

Management ownership (MO) is taken from *Crawford's Directory of City Connections* and is the percentage of ordinary shares held by members of the board, their families and associates. *Crawford's Directory* is an annual publication. The directory for the same year as the bid was consulted. Where this information is not avilable in *Crawford's Directory,* beneficial interests of the directors and their families, as disclosed in the takeover documents, are used.[2] Where the bidder is an

**Table 1**
**Analysis of takeover bids**

| | Agreed | Contested bids | | | Total |
|---|---|---|---|---|---|
| | *Agreed*<br>*No. (%)* | *Hostile*<br>*No. (%)* | *Competing*<br>*No. (%)* | *White knight*<br>*No. (%)* | *Total*<br>*No. (%)* |
| Completed bids | 462 ( 97) | 80 ( 50) | 26 ( 53) | 12 ( 80) | 580 ( 83) |
| Failed bids | 15 ( 3)[1] | 80 ( 50) | 23 ( 47) | 3 ( 20) | 121 ( 17) |
| | **477 (100)** | **160 (100)** | **49 (100)** | **15 (100)** | **701 (100)** |

[1] These 15 agreed bids did not complete because either the bid was aborted by the bidder or because shareholders would not accept the terms of the offer.

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[1] For example, for a year end of 31/12/1992, if the bid date is 23/12/1992 BHOR is +9 days. If the bid date is 3/1/1993 BHOR is −3 days.

[2] In many cases, insufficient information was available in takeover documents to facilitate easy calculation of MO. Consequently, the information in *Crawford's Directory* was used, even though some changes in MO may have taken place be-

**Table 2**
**Frequency of forecast disclosure**

| *Bid* | *Forecast*<br>*No.* | *No forecast*<br>*No.* | *Total*<br>*No.* |
|---|---|---|---|
| Agreed bids | 33 | 444 | 477 |
| Contested bids | 26 | 198 | 224 |
| | **59** | **642** | **701** |
| *Forecast* | | | |
| Voluntary | 47 | | |
| Repeat/involuntary | 19 | | |
| | **66** | | |

individual, a consortium of individuals or a family company, MO is recorded as 100%.

Large block shareholdings (LBS) is the percentage equity of the company held by substantial (>5%) shareholders. This information is also obtained from *Crawford's Directory*.

Size (SIZE) is proxied by turnover measured in £m. Amounts were extracted from the most recent full set of accounts in each takeover document. Foreign currency amounts are translated at the rates ruling on balance sheet dates. Monthly foreign exchange rates were obtained from *Datastream*.

Listing status (QUOTED) is a dummy variable with the value 0 for companies not quoted on the London Stock Exchange and 1 for quoted companies.

Industry codes (IND) are obtained from *Crawford's Directory*. Crawford's industry index is based on categories used by the *Financial Times*. These were re-coded into five dummy variables: capital goods, consumer-durable goods, consumer non-durable goods, other and banks and financial.

Nationality of bidder (NAT) is available from *Acquisitions Monthly*. There were 26 nationalities in the sample. These were coded 0 for UK/Irish bidders and 1 for other nationalities.

*3.4. Measurement of news variables*

Deviation from market expectations (ME) measures the difference between subsequent actual profit before taxation and consensus analysts' forecast of profit before taxation for the year. Consensus analysts' forecasts are taken from *The Earnings Guide*. This is a monthly publication; the data are extracted from the issue closest to and prior to the bid date. Subsequent actual results are also obtained from *The Earnings Guide*. The variable is scaled as follows:

$$\mathrm{ME} = \frac{\text{Consensus analysts' forecast profit before tax - Actual profit before tax}}{\text{Actual profit before tax}}$$

Only 212 readings are available for ME. Coverage by *The Earnings Guide* is limited to UK publicly-quoted companies widely followed by analysts.

ME is analysed between positive (POSME) and negative (NEGME) deviations. A positive deviation is one that is greater than zero; a negative deviation is less than or equal to zero. Forecast deviation (FD) is the difference between forecast results and market expectations, as measured by consensus analysts' forecasts from *The Earnings Guide*. Consensus analysts' forecasts were obtained from the issue of the guide closest to and prior to the bid date. The difference was scaled as follows:

$$\mathrm{FD} = \frac{\text{Forecast profit before tax} - \text{Consensus analysts' forecast profit before tax}}{\text{Consensus analysts' forecast profit before tax}}$$

## 4. Results

*4.1. Factors influencing disclosure*

The frequency of forecast disclosure by bidders is summarised in Table 2. In all, 66 forecasts were disclosed in 59 bids (out of 701 bids—8%). Of the 66 forecasts, six related to either (i) forecasts of the combined group after takeover (often called *pro-forma* forecasts) or (ii) forecasts in respect of subsidiary companies of the bidder. More than one forecast was disclosed in some bids. A second forecast by a bidder is ignored for the purposes of the ensuing analysis, as are involuntary and repeat forecasts, leaving 47 bidders voluntarily disclosing a forecast.

Summary descriptive statistics for all continuous variables are shown in Table 3. Missing values are a problem with some variables, especially LBS which is missing in 59% of cases. MO is missing in 32% of cases. Missing values are particularly a

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tween publication of the Directory and the date of takeover bids.

**Table 3**
**Descriptive statistics of continuous independent variables**

| *Variable* | *Mean* | *Median* | *Skewness* | *Standard deviation* | *No.* | *Missing values* | *Total* |
|---|---|---|---|---|---|---|---|
| Bid horizon (days) | 118 | 117 | −0.26 | 117 | 571 | 130 (19%) | 701 |
| Size (£m) | 1,274 | 167 | 9.61[1] | 4,057 | 544 | 157 (22%) | 701 |
| % Management ownership | 30.1 | 9.9 | 1.02 | 38.0 | 478 | 223 (32%) | 701 |
| % Large block shareholdings | 46.4 | 28.7 | 0.55 | 37.3 | 285 | 416 (59%) | 701 |

[1] This value (compared with values given in tables by Kanji (1993: 43)) would indicate that assumptions that the variables are distributed normally are inappropriate.

Bid horizon = Days from the date of the bid to the accounts year end date for which accounts have not been published.
Size = Turnover measured in £m
% Management ownership = % ordinary shares held by members of the board, their families and associates
% Large block shareholdings = % equity of the company held by substantial (>5%) shareholders

problem with bidders that are individuals, consortiums, private companies and foreign companies.

SIZE is highly positively skewed and assumptions of normality may be inappropriate. Consequently, non-parametric bivariate statistical tests (which require few assumptions about the form of distribution of the variables) are reported in this paper. Spearman bivariate rank correlations to examine correlation between the independent variables are shown in Table 4.

There are three high correlations:

- QUOTED—LBS (−0.78)—Quoted companies are (as expected) less likely than unquoted (e.g. private, family-owned companies, consortia) to have large block shareholders;
- MO—LBS (0.61)—Private, family-owned companies and consortia are likely to have large block shareholders and, for the same reason, high percentage management ownership; and
- MO—SIZE (−0.49)—Private, family-owned companies and consortia with high percentage management ownership are significantly smaller firms.

The correlations in Table 4 also indicate that non-UK/Irish companies are significantly less likely to be quoted on the London Stock Exchange and to issue shares as consideration for the target. Foreign bidders are significantly larger than UK/Irish bidders. Firms with large block shareholdings are less likely to issue shares or a mixture of shares and cash as consideration for the target. Lastly, smaller firms are less likely to issue shares in consideration for the target.

In conclusion, there are few high correlations among the independent variables other than those highlighted.

Table 5 reports Mann-Whitney U test results of differences in mean rankings of the continuous variables of forecasting and non-forecasting bidders. The analysis is run on three different samples (i) the full sample of all available cases for analysis, (ii) the sample corresponding to the full model in logit analysis (see Table 7), and (iii) the sample based on the reduced model.

Mean rankings differ significantly on BHOR for all three samples. Forecast disclosure is associated with lower bid horizons. In the case of the full sample only, mean rankings on SIZE and LBS are significantly different for forecasters and nonforecasters. Smaller bidders (contrary to expectations) and lower large block shareholdings are associated with forecast disclosure. The unexpected finding between size and forecast disclosure may be explained by the presence in the full sample of foreign firms which are significantly larger than UK and Irish firms. Such firms are less likely to disclose a forecast. When foreign firms are excluded in the two smaller samples in Table 5, the mean rankings of size for forecasters is (as one would expect) higher (although not significantly so).

Table 6 summarises the analysis of categorical variables between forecasters and non-forecasters. As predicted, the frequency of forecast disclosure by bidders is greater during contested bids. Of the 47 voluntary forecasts, 26 were disclosed during agreed bids and 21 during contested bids. Thus, a forecast was disclosed in only 5% of all agreed bids, whereas one was disclosed in 9% of all contested bids.

Purchase consideration ranged between cash, paper and various combinations of cash and paper. Nearly half were cash bids, with the remainder fairly evenly divided between paper or a mixture

**Table 4**
**Bivariate Spearman correlations for independent variables**

| | *BID* | *DCASH* | *DPAPER* | *DMIXED* | *BHOR* | *SIZE* | *MO* | *LBS* | *QUOTED* | *NAT* |
|---|---|---|---|---|---|---|---|---|---|---|
| BID | | | | | | | | | | |
| DCASH | −0.03 | | | | | | | | | |
| DPAPER | −0.09* | 0.08 | | | | | | | | |
| DMIXED | 0.02 | 0.45** | 0.52** | | | | | | | |
| BHOR | 0.03 | −0.03 | 0.12* | 0.07 | | | | | | |
| SIZE | −0.01 | 0.24** | −0.35** | −0.10* | −0.01 | | | | | |
| MO | −0.16** | −0.09 | −0.17** | −0.26** | −0.15* | −0.49** | | | | |
| LBS | −0.12* | −0.02 | −0.31** | −0.32** | 0.00 | −0.33** | 0.61** | | | |
| QUOTED | 0.07 | −0.14** | 0.43** | 0.32** | 0.09* | −0.21** | −0.42** | −0.78** | | |
| NAT | −0.05 | 0.14** | −0.39** | −0.26** | −0.08 | 0.40** | 0.08 | 0.18** | −0.50** | |
| DCAPGDS | 0.04 | 0.00 | 0.04 | 0.03 | 0.09 | 0.15** | −0.10 | −0.04 | 0.10 | −0.01 |
| DDURGDS | −0.05 | −0.03 | 0.03 | 0.02 | 0.07 | 0.01 | 0.02 | 0.00 | 0.02 | 0.03 |
| DNONDUR | 0.03 | 0.10 | 0.00 | 0.06 | −0.05 | 0.03 | 0.13* | −0.07 | 0.07 | 0.02 |
| DOTHER | −0.03 | −0.04 | −0.04 | −0.05 | −0.11* | 0.01 | −0.06 | 0.08 | −0.01 | 0.00 |
| DFIN | 0.01 | −0.05 | −0.04 | −0.06 | 0.02 | −0.27** | 0.04 | 0.04 | −0.21** | −0.04 |

**Significant at <0.01 *Significant at ⩽0.05
Number of cases varied depending on availability of data on each pair of variables

BID =Type of bid: Agreed, Contested
DCASH, DPAPER, DMIXED =Type of purchase consideration: Cash, Paper, Mixed (Cash and paper)
BHOR =Bid horizon: Days from the date of the bid to the accounts year end date for which accounts have not been published
SIZE =Turnover measured in £m
MO =Management ownership: % ordinary shares held by members of the board, their families and associates
LBS =Large block shareholdings: % equity of the company held by substantial (>5%) shareholders
QUOTED =Listing status: Unquoted/quoted on the London Stock Exchange
NAT =Nationality: UK/Irish bidders, Other nationality bidders
DCAPGDS, DDURGDS, DNONDUR, DOTHER, DFIN =Industry: Five categories—Capital goods, Durable goods, Non-durable goods, Financial, Other

**Table 5**
**Mann-Whitney U tests of differences in mean rankings between forecasters and non-forecasters for each continuous independent variable**

| | *Mean rank* | | | |
|---|---|---|---|---|
| | *Based on full sample of available cases* | | | |
| | *Forecasters* | *Non-forecasters* | *Z-stat.* | *Two-tailed probability* |
| Bid horizon | 207 | 293 | −3.42 | 0.00** |
| Size | 227 | 276 | −1.96 | 0.05* |
| % Management ownership | 206 | 243 | −1.61 | 0.11 |
| % Large block shareholdings | 104 | 146 | −2.35 | 0.02* |
| | *Based on sample size of 316 per reduced model in Table 7* | | | |
| | *Forecasters* | *Non-forecasters* | *Z-stat.* | *Two-tailed probability* |
| Bid horizon | 87 | 168 | −4.93 | 0.00** |
| Size | 150 | 160 | −0.62 | 0.53 |
| % Management ownership | 165 | 159 | −0.38 | 0.71 |
| % Large block shareholdings | 99 | 96 | −0.26 | 0.79 |
| | *Based on sample size of 192 per full model in Table 7* | | | |
| | *Forecasters* | *Non-forecasters* | *Z-stat.* | *Two-tailed probability* |
| Bid horizon | 44 | 103 | −4.74 | 0.00** |
| Size | 89 | 97 | −0.62 | 0.53 |
| % Management ownership | 107 | 95 | −0.90 | 0.38 |
| % Large block shareholdings | 99 | 96 | −0.26 | 0.79 |

**Significant at <0.01 *Significant at ≤0.05

Bid horizon = Days from the date of the bid to the accounts year end date for which accounts have not been published
Size = Turnover measured in £m
Management ownership = % ordinary shares held by members of the board, their families and associates
Large block shareholdings = % equity of the company held by substantial (>5%) shareholders

of cash and paper bids. Less than half the bidders are quoted companies. A good spread of industries is represented in the population. The majority of firms are UK/Irish firms, with a substantial group of foreign companies. There are a large number of missing values on the variable industry.

Purchase consideration, listing status and nationality were significantly different for forecasting and nonforecasting bidders. The frequency of disclosure is significantly greater in bids where the purchase consideration is paper or mixed (cash and paper), and by listed and UK/Irish bidders. These findings are all in the predicted directions.

Only four bidders disclosed forecasts during cash bids. In two of these bids, forecast disclosure was motivated by the sale of shares to bidding company shareholders (to raise cash for the bid) rather than the takeover. In the remaining two bids, the contested nature of the bid seems to be the motivation for disclosure, even though the consideration is cash. Disclosure of a forecast might have been made to influence target shareholders (or possibly bidder shareholders) concerning the competence of bidder's management ability. Only two foreign bidders disclosed a forecast. Both were Dutch quoted companies.

Multivariate analysis is carried out using logistic regression (logit analysis) to test the dichotomous dependent variable: disclosure/nondisclosure of a forecast. Logit models measure the probability of an event (disclosure/nondisclosure of a forecast) in the form ln (p/1-p) rather than as a pure probability value. The object of the logit model is to find estimates of regression coefficients which maximise the log likelihood that the observed pattern of forecast disclosure would have occurred. Maximum likelihood estimation is used to estimate logit parameters that imply the highest probability or likelihood of having obtained the observed sample. The variables CON and IND have

**Table 6**
**Differences in categorical variables between forecasters and non-forecasters**

| **Bid** | *Forecasters*<br>*No. (%)* | *Non-forecasters*<br>*No. (%)* |
|---|---|---|
| Agreed | 26 ( 55) | 451 ( 69) |
| Contested | 21 ( 45) | 203 ( 31) |
| | **47 (100)** | **654 (100)** |
| Pearson chi-square 3.75 (d.f. 1) Significance 0.05* | | |
| *Purchase consideration* | | |
| Cash | 4 ( 9) | 334 ( 52) |
| Paper | 25 ( 54) | 167 ( 26) |
| Cash and paper | 17 ( 37) | 146 ( 22) |
| | 46 **(100)** | 647 **(100)** |
| Missing values | 1 | 7 |
| | **47** | **654** |
| Pearson chi-square 32.63 (d.f. 2) Significance 0.00** | | |
| *Listing status* | | |
| Quoted | 38 ( 81) | 293 ( 45) |
| Unquoted | 9 (19) | 361 ( 55) |
| | **47 (100)** | **654 (100)** |
| Pearson chi-square 22.86 (d.f. 1) Significance 0.00** | | |
| *Industry* | | |
| Capital goods | 7 ( 19) | 86 ( 27) |
| Durable goods | 8 ( 22) | 30 ( 9) |
| Non-durable goods | 7 ( 20) | 81 ( 25) |
| Banks and financial | 8 ( 22) | 75 ( 24) |
| Other | 6 ( 17) | 48 ( 15) |
| | 36 **(100)** | 320 **(100)** |
| Missing values | 11 | 334 |
| | **47** | **654** |
| Pearson chi-square 6.22 (d.f. 4) Significance 0.18 | | |
| *Nationality* | | |
| UK/Irish companies | 45 ( 96) | 475 ( 73) |
| Other nationalities | 2 ( 4) | 179 ( 27) |
| | **47 (100)** | **654 (100)** |
| Pearson chi-square 12.23 (d.f. 1) Significance 0.00** | | |

**Significant at $<0.01$ *Significant at $\leq 0.05$

more than two categories. The effect of these categories is calculated by reference to the average effect of all categories (rather than compared with a single category) (Norusis, 1994:13).

The variables' SIZE, MO and LBS are log-transformed for logit analysis to reduce skewness (to LNSIZE, LNMO and LNLBS).

The model chi-square goodness-of-fit statistic is calculated. Explained variation of the model is measured by McFadden's pseudo $R^2$. The significance level for each coefficient is measured using the Wald statistic which has a chi-square distribution.

In order to increase the number of cases analysed, it was decided to test a reduced model excluding LBS, which has a large number of missing values. Exclusion of LBS increases the number of cases analysed from 192 to 316 (out of a maximum of 701 cases). The models analysed are summarised as follows:

Full model: p(disclosure) =*f*(BID, BHOR, CON, MO, LBS, SIZE, QUOTED, IND, NAT)

Reduced model: p(disclosure) =*f*(BID, BHOR, CON, MO, SIZE, QUOTED, IND, NAT)

Table 7 shows that in the full model only two variables, BHOR and BID, are significant. As pre-

**Table 7**
**Parameter estimates of logit regression of forecast disclosure**

| Explanatory variables | *Full model including LBS* Regression coefficients | Wald[1] | *Reduced model excluding LBS* Regresion coefficients | Wald[1] |
|---|---|---|---|---|
| Intercept | −3.32 | 0.17 | −2.02 | 4.65* |
| BHOR | −4.74 | 17.46** | −3.66 | 23.00** |
| BID | 1.15 | 4.07* | 1.01 | 5.82* |
| CON (Cash)[2] | −5.86 | 0.14 | −1.32 | 6.17* |
| CON (Paper)[2] | 2.85 | 0.13 | 0.95 | 7.26** |
| LNMO | 0.17 | 0.74 | −0.01 | 0.00 |
| LNLBS | 0.25 | 0.30 | | |
| LNSIZE | 0.14 | 0.73 | 0.06 | 0.32 |
| QUOTED | −1.15 | 0.59 | −0.23 | 0.06 |
| IND (Capital goods)[2] | −0.36 | 0.46 | −0.31 | 0.60 |
| IND (Durable goods)[2] | 0.72 | 1.21 | 0.98 | 5.22* |
| IND (Non-durable goods)[2] | −0.17 | 0.12 | −0.53 | 1.73 |
| IND (Other)[2] | −0.58 | 1.11 | −0.23 | 0.65 |
| Model chi-square[3] | 46.19 (d.f. 12)** | | 48.04 (d.f. 11)** | |
| McFadden's $R^2$[4] | 33.8% | | 22.3% | |
| Number of observations | 192 cases | | 316 cases | |

**Significant at <0.01; *Significant at ≤0.05

[1] The Wald statistic tests the null hypothesis that a coefficient is 0. It has a $\chi^2$ distribution.

[2] The third purchase consideration dummy and the fifth industry dummy are captured in the intercept term.

[3] Model chi-square is the difference between −2 log likelihood for the model with only a constant and −2 log likelihood for the current model. The model chi-square tests the null hypothesis that the coefficients for all terms in the current model except the constant are 0. This can be used to test whether a set of predictors improves the fit of a model (McCullagh and Nelder, 1989: 118–119). Other goodness of fit statistics such as −2 log likelihood or the Hosmer-Lemeshow Goodness of Fit are not reported as SPSS does not print p-values for these because the assumptions underlying their chi-square approximation are rarely met in practice.

[4] This is 1 − (log likelihood at convergence/log likelihood with constant term only). It provides a measure of the explanatory power of the logit model and is similar to the $R^2$ value in OLS regression.

[5] A classification Table to accompany this analysis is shown in Appendix 1.

dicted, the probability of disclosure increases as bid horizon decreases and in contested bids. In the reduced model, in addition to BHOR and BID, CON and IND are significant. The probability of disclosure increases as bid horizon decreases, during contested bids and in paper bids. Conversely, a forecast is less probable in cash bids. A forecast is significantly more likely in the durable goods industry. Profits may be easier to forecast in this type of industry.

McFadden's $R^2$ declined from 34% in the full model to 22% in the reduced model. Both the full and reduced models are significant at conventional levels.

### *4.2. Influence of good news/bad news*

Table 8 analyses deviations from market expectations (ME) for bidders between forecasters and non-forecasters. A forecast is disclosed in 16 cases (out of 121—13%) with positive deviations from expectations (POSME) and in seven cases (out of 91—8%) with negative deviations (NEGME). However, chi-square statistics indicate that this difference in frequency is not significant.

Mann-Whitney U test results in Table 9 show that the mean rankings in deviation from market expectations overall, and of the negative subsample, are significantly different for forecasters and non-forecasters. In both cases, mean rankings are significantly higher where a forecast was disclosed. There is no significant difference in mean rankings for the positive deviations subsample.

Thus, for deviations of market expectations overall, the result indicates that a forecast is more likely the better the news. However, for the subset of firms with good news to disclose, the extent of good news does not appear to influence the disclosure decision. This is not the case with the negative sub-sample of firms. The results suggest that the worse the bad news, the less likely a forecast. In other words, when the bad news is very bad, a

**Table 8**
**Analysis of deviation from market expectations variables**

| | *Forecasters*<br>*No. (%)* | *Non-forecasters*<br>*No. (%)* |
|---|---|---|
| Positive market expectations | 16 ( 70) | 105 ( 56) |
| Negative market expectations | 7 ( 30) | 84 ( 44) |
| | **23 (100)** | **189 (100)** |

Pearson chi-square 1.62 (d.f. 1) Significance 0.19

**Table 9**
**Mann-Whitney U tests of differences in mean rankings between forecasters and non-forecasters for deviation from market expectations variables**

| | *Mean rank* | | | |
|---|---|---|---|---|
| | *Forecasters* | *Non-forecasters* | *Z-statistic* | *Two-tailed probability* |
| Market expectations | 135 | 103 | −2.37 | 0.02* |
| Positive market expectations | 70 | 60 | −1.14 | 0.25 |
| Negative market expectations | 75 | 44 | −3.06 | 0.00** |

**Significant at <0.01 *Significant at ≤0.05

forecast is less likely. In summary, a forecast is more likely if there is good news to disclose or if the bad news to be disclosed is not too bad. Overall, these results provide evidence to support the hypothesis that forecast disclosure is more likely when firms have good news to disclose.

The logit models in Table 7 were re-run including the news variable ME. The variable was included in the models in two ways: the absolute value (ABSME) which measures the absolute difference between consensus analysts' forecasts and subsequent actual results. This tests whether the disclosure decision is influenced by variations from market expectations on their own. The models are also run including the signed value of ME, which examines the combined influence of variations from market expectations and the news content of the variation. Only 107/184 cases are available for analysis in the full/reduced model.

Table 10 shows that the model including ABSME gives similar results to the models in Table 7. ABSME is not significant in the model, suggesting that variations from market expectations, on their own, are not influencing the disclosure decision.

However, the signed ME variable is highly positively significant in both the full and reduced models. This suggests that bidders are significantly more likely to disclose forecasts when there is good news to communicate. Thus, in the context of takeover bids, the findings do not support the expectations adjustment hypothesis of Ajinkya and Gift (1984) that forecasts occur in cases in which good news adjustments are called for and in cases of bad news adjustments.

As forecasts are often made very close to the year end, and sometimes cover only a short (say six-month) period, it is questionable whether they add any value or disclose new information to the market. Quantitative forecasts disclosed were compared with consensus analysts' forecasts to examine the amount of 'new' information disclosed in the management forecast. As shown in Table 2 earlier, there were 66 forecasts by bidders in the sample. Table 11 analyses the forecasts by degree of quantification—whether point, range or not quantified. Of the 66 forecasts, 55 were quantified—14 point forecasts and 41 range forecasts.

Forecast deviations (FD) (comparison of the forecast with consensus analysts' forecast) for the quantitative forecasts were calculated. A comparison consensus analyst forecast was only available in 23 (42%) cases. There were 11 (48%) forecasts within +/−5% of consensus analyst forecasts—i.e., with only a small amount of new information to disclose to the market. However, in 12 cases (52%) the deviation was greater than 5% of prevailing consensus analyst forecasts, suggesting that some forecasts do occur when there is new information to communicate and when good news/bad news adjustments are needed. Only five (22%) forecasts were +/−10% of consensus analyst forecasts, of which only two were more than 20% greater.

**Table 10**
**Parameter estimates of logit regression of forecast disclosure including ABSME and signed ME variables**

| | *ABSME* | | | | *Signed ME* | | | |
|---|---|---|---|---|---|---|---|---|
| | *Full model including LBS* | | *Reduced model excluding LBS* | | *Full model including LBS* | | *Reduced model excluding LBS* | |
| *Explanatory variables* | *Regression coefficients* | *Wald*[1] | *Regression coefficients* | *Wald*[1] | *Regression coefficients* | *Wald*[1] | *Regresssion coefficients* | *Wald*[1] |
| Intercept | −2.43 | 0.03 | −0.24 | 0.01 | −0.63 | 0.00 | −1.60 | 0.66 |
| BHOR | −7.54 | 8.04** | −3.81 | 11.29** | −13.82 | 6.56* | −4.58 | 12.72** |
| BID | 2.96 | 6.79** | 1.42 | 5.91* | 4.98 | 6.76** | 1.75 | 7.62** |
| CON (Cash)[2] | −7.95 | 0.08 | −1.68 | 4.99* | −15.72 | 0.21 | −2.18 | 6.04* |
| CON (Paper)[2] | 4.89 | 0.13 | 1.53 | 9.41** | 9.84 | 0.33 | 1.89 | 10.85** |
| LNMO | 0.05 | 0.02 | −0.14 | 0.76 | −0.07 | 0.04 | −0.17 | 1.09 |
| LNLBS | −0.36 | 0.15 | | | −0.26 | 0.04 | | |
| LNSIZE | −0.14 | 0.13 | −0.09 | 0.15 | −0.52 | 1.05 | −0.05 | 0.05 |
| QUOTED | −4.20 | 2.96 | −1.34 | 0.90 | −9.05 | 5.09* | −0.87 | 0.34 |
| IND (Capital goods)[2] | 0.21 | 0.04 | −0.96 | 2.16 | 0.86 | 0.48 | −0.81 | 1.39 |
| IND (Durable goods)[2] | 1.37 | 1.67 | 1.25 | 3.49* | 0.92 | 0.64 | 1.81 | 6.06* |
| IND (Non-durable goods)[2] | 0.56 | 0.48 | −0.27 | 0.21 | 0.46 | 0.23 | −0.09 | 0.02 |
| IND (Other)[2] | −0.40 | 0.24 | −0.16 | 0.09 | 0.59 | 0.24 | 0.36 | 0.37 |
| ABSME/ME | 3.01 | 1.87 | −0.47 | 0.07 | 7.02 | 6.78** | 2.44 | 6.69** |
| Model chi-square[3] | 38.07 (d.f. 13)** | | 41.23 (d.f. 12)** | | 49.03 (d.f. 13)** | | 48.12 (d.f. 12)** | |
| McFadden's R$^2$[4] | 58.2% | | 31.6% | | 61.9% | | 36.8% | |
| Number of observations | 107 cases | | 184 cases | | 107 cases | | 184 cases | |

**Significant at <0.01; *Significant at ≤0.05

[1] The Wald statistic tests the null hypothesis that a coefficient is 0. It has a $\chi^2$ distribution.

[2] The third purchase consideration dummy and the fifth industry dummy are captured in the intercept term.

[3] Model chi-square is the difference between −2 log likelihood for the model with only a constant and −2 log likelihood for the current model. The model chi-square tests the null hypothesis that the coefficients for all terms in the current model except the constant are 0. This can be used to test whether a set of predictors improves the fit of a model (McCullagh and Nelder, 1989: 118–119). Other goodness of fit statistics such as −2 log likelihood or the Hosmer-Lemeshow Goodness of Fit are not reported as SPSS does not print p-values for these because the assumptions underlying their chi-square approximation are rarely met in practice.

[4] This is 1—(log likelihood at convergence/log likelihood with constant term only). It provides a measure of the explanatory power of the logit model and is similar to the R$^2$ value in OLS regression.

[5] A classification Table to accompany this analysis is shown in Appendix 1.

**Table 11**
**Quantification of bidders' forecasts**

| *Quantification* | *Voluntary* *No.* | *Involuntary/repeat* *No.* | *Total* *No.* |
|---|---|---|---|
| Point | 14 | 0 | 14 |
| Range | 37 | 4 | 41 |
| Not quantified | 2 | 9 | 11 |
| | 53 | 13 | 66 |

Pearson chi-square 32.83 (d.f. 2) Significance 0.00**
**Significant at <0.01

**Table 12**
**Extent of new information in quantitative forecasts**

| | No. |
|---|---|
| *Negative forecast deviations* | |
| Management forecast >10% lower than consensus analyst forecasts | 1 |
| Management forecast 5-10% lower than consensus analyst forecasts | 2 |
| Management forecast 0-5% lower than consensus analyst forecasts | 4 |
| *Positive forecast deviations* | |
| Management forecast 0-5% higher than consensus analyst forecasts | 7 |
| Management forecast 5-10% higher than consensus analyst forecasts | 5 |
| Management forecast 10-20% higher than consensus analyst forecasts | 2 |
| Management forecast >20% higher than consensus analyst forecasts | 2 |
| | 23 |

The majority (16—70%) of forecasts in Table 12 are positive (good news) forecasts (i.e. forecast greater than prevailing market expectations as measured by consensus analyst forecasts). Nonetheless, there were seven (30%) negative forecasts. This suggests that, although disclosure is influenced by good news, in come cases bad news may also be disclosed.

### 4.3. *Accuracy of forecasts*

Although not a primary objective of this paper, the accuracy of forecasts is of interest, mainly because there is a widespread perception that forecasts may not be reliable. This is driven to a large extent by the substantial press coverage in cases where forecasts are not realised. For example, Sketchley, a target company which successfully beat off two hostile bids in 1990, forecast pre-tax profits of £6m during both bids. Actual results amounted to losses of £2m (£8.1m after tax and extraordinary items). This event attracted pages of comment in the financial press. Conversely, there is little comment when a forecast is met, and maybe only one or two lines of comment where actual results substantially exceed the forecast.

Measuring the accuracy of forecasts disclosed during takeovers is difficult. Dev and Webb (1972), among others, have pointed to the non-comparability of forecast results with actual results after takeover. New managements are likely to adopt new operating policies and different accounting assumptions. In addition, they are unlikely to separately disclose the results of the companies taken over. Dev and Webb (1972) suggest that it is only when bids fail that forecast and actual profits are likely to be on a comparable basis, subject to the additional caveat that there is evidence that management may attempt to fit actual results to the forecast after the takeover (Ferris, 1975).

Actual results were only available from *Datastream* and/or *The Earnings Guide* in 26 (47%) cases. Reasons for unavailability of data include where the bidder is not a UK company, where the forecast is for a period other than a year and where an unusual financial item such as a dividend or trading margin is forecast.

Results in Table 13 show that the forecast was met in all 26 cases. This is to be expected. Bidders, unlike target companies, control and choose the timing of the bid, which is usually when the bidder is performing well. There were 17 (65%) forecasts within 5% of the subsequent actual results. In four (15%) cases, the forecast exceeded actual results by 5-10% and in three (12%) cases by 10-20%. In the case of two forecasts, actual results substantially exceeded the forecast. This may be due to forecast inaccuracy, or because the subsequent actual results are based on a different group composition (for example, including the target taken over).

## 5. Comparison of forecast disclosure by bidders and targets

### *5.1. Differences in explanators of forecast disclosure between bidders and targets*

Forecasts may be disclosed by bidders, targets or both parties during takeover bids. Motivations for disclosure by bidders and targets are compared and summarised in Table 14, which shows that they are quite different.

Disclosure of forecasts by target companies has been examined in Brennan (1999). Explanators of disclosure for bidders and targets are summarised in Table 15. Similar to the findings for bidders in this paper, target companies were found to be significantly more likely to disclose a forecast during contested bids and, only in the case of agreed bids, where the bid horizon was lowest. In contested bids, large block shareholdings significantly increased the likelihood of a target company forecast. By contrast, purchase consideration was a significant factor in influencing disclosure by bidding companies.

For both bidders and targets, there was a clear tendency to disclose good news forecasts.

### *5.2 Interaction between bidders and targets in disclosing forecasts*

There is a considerable amount of verbal jousting in takeover documents, especially during contested bids. In respect of profit forecasts, this can take two forms. Sometimes one side attacks the other for not disclosing a forecast to support assertions made in an earlier takeover document. For example, the extract below shows Grampian attacking Macarthy for not providing a forecast. However, shareholders in Macarthy were not convinced by this attack as Grampian's bid was not successful.

> 'Macarthy has not given any clear information on its current trading and still has not published the interim results for the six months ended 31st March 1991. As shareholders, you must be wondering why your Board is unable or unwilling to provide any indication of the results for the current financial year and whether Macarthy's earnings per share in 1991 will reach even last year's level.'

IMI, in its 1991 bid for Birmingham Mint, used the absence of a forecast to attack Birmingham Mint's dividend forecast.

> 'Despite claims of *"excellent prospects for the 1990's"* your board has failed to publish a profit forecast to justify this claim.
>
> —The forecast full year dividend of 6.5p is irresponsible. It will not be adequately covered by earnings and will further weaken the cash position.
> —There is no evidence to suggest that future dividends can be sustained at this level.'

Alternatively, if there is disclosure, the forecast itself may be attacked. For example, target company Pleasurama attacked Mecca's forecast in 1988 for the calculation of growth rate in its forecast.

> **'Mecca's growth: 24 or 10%?**
> Mecca forecasts growth in earnings per share of not less than 24 per cent. (before excep-

**Table 13**
**Accuracy of bidders' forecasts**

| | *No.* |
|---|---|
| Data available | 26 |
| Data not available | 29 |
| Quantified forecasts | 55 |
| *Level of accuracy* | |
| Actual results less than forecast | 0 |
| Actual results 0-5% greater than forecast | 17 |
| Actual results 5-10% greater than forecast | 4 |
| Actual results 10-20% greater than forecast | 3 |
| Actual results 20% or more greater than forecast | 2 |
| | 26 |

**Table 14**
**Comparison of motivations for disclosure of forecasts by bidders and targets**

| *Bidders* | *Targets* |
|---|---|
| *Motivations in agreed bids* | |
| • To support price of shares being offered to target shareholders as consideration for the target | • To support directors' recommendation to target shareholders to accept the bid |
| • To support price of new shares issued to bidding company shareholders to raise cash to acquire the target | • Required by bidder to support information provided during bid negotiations |
| • To put information into the public domain to enable it to be discussed privately | • To put information into the public domain to enable it to be discussed privately |
| *Motivations in contested bids* | |
| • To support price of shares being offered to target shareholders as consideration for the target | • To persuade target shareholders that the bid price is inadequate |
| • To support price of new shares issued to bidding company shareholders to raise cash to acquire the target | • To persuade target shareholders that current management will run the company better than bidding company management |
| • To put information into the public domain to enable it to be discussed privately | • To signal that the target company is going to strongly defend the bid |
| • To persuade target shareholders that bidding company management will run the company better than current management | • To get an increase in the bid price |

*Source:* Derived from Brennan (1998)

> tional property profits). This forecast includes the one-off benefit from the timing of the acquisition of Ladbroke Holidays. The exclusion of three of Ladbroke Holidays' loss-making winter months is estimated to have saved £1.5m and **next year's results will bear the full impact of these losses.** Pleasurama estimates that if this benefit had not been available and financing for the acquisition had been in place for the full year, **the pro forma growth in earnings per share (before exceptional property profits) would have been less than 10 per cent** (assuming that Mecca's profit forecast for the year ended 30th September 1988 is exactly achieved).'

General Motors based its attack on the use of misleading information in the forecast.

> 'SD-Scicon multiplies its forecast profits by other software company price earnings multiples. This is misleading.'

Table 16 examines forecast disclosure patterns for evidence of interaction between bidders and target firms and forecast disclosure. In 504 (77%) bids, no forecast was disclosed by either party to the bid. A forecast was disclosed by target companies in 114 (16%) of bids, while a forecast was disclosed by bidders only in 20 (3%) bids. In only 27 (4%) bids did both the bidder and target company disclose a forecast, suggesting that in only a small minority of cases does disclosure by one party to the bid prompt disclosure by the other party. There is a significant difference in disclosure patterns between agreed and contested bids. In contested bids forecast disclosure is more likely, particularly by target firms.

## 6. Summary and conclusions

This research is concerned with profit forecast disclosure by bidders during UK takeover bids. The very fact that there is a significant level of profit forecast disclosure during UK takeover bids, while there is little such disclosure in routine, periodical contexts, suggests intuitively that the major determinants in the decision to disclose profit forecasts during takeover bids are themselves takeover-specific.

Moreover, the fact that there is a general culture hostile to routine disclosure of profit forecasts in the UK suggests that bidders' general motivation will be to make no disclosure unless there are very attractive or compelling reasons. If disclosure of profit forecasts were a routine feature of company behaviour, a decision to make a forecast in a takeover situation would not require any particularly strong motivation. Conversely, if strong motiva-

**Table 15**
**Comparison of explanators of forecast disclosure between bidders and targets**

| *Bidders* | *Targets* |
|---|---|
| Type of bid* | Type of bid** |
| Bid horizon** | Bid horizon**[1] |
| Purchase consideration** | |
| Management ownership | Management ownership |
| Large block shareholdings | Large block shareholdings**[2] |
| Size of firm | Size of firm*[2] |
| Listing status | |
| Industry* | Industry*[1] |
| Nationality | |
| Good news** | Good news** |

**Significant at <0.01; *Significant at ⩽0.05
[1]Agreed bids only
[2]Contested bids only

**Table 16**
**Interaction of forecast disclosure by bidders and targets**

| *Forecast disclosure* | *Agreed bids*<br>*No.* | *Contested bids*<br>*No.* | *Total*<br>*No.* |
|---|---|---|---|
| No forecast by either bidder or target | 402 | 138 | 540 |
| No forecast by bidder, forecast by target | 49 | 65 | 114 |
| Forecast by bidder, none by target | 13 | 7 | 20 |
| Forecast by both bidder and target | 13 | 14 | 27 |
| | **477** | **224** | **701** |

Pearson chi-square 48.10 (d.f. 3) Significance 0.00**
**Significant at <0.01

tion is needed to overcome a general reluctance to disclose profit forecasts, one would intuitively expect to find this confirmed by statistical analysis.

Many bidders not normally disclosing profit forecasts were found to do so during takeover bids. Disclosure choices were dominated by the takeover context of the research. Two variables, type of bid and bid horizon, accounted for almost all the variation in disclosure.

Probability of forecast disclosure was greater the shorter the bid horizon and during contested bids. The closer the bid date to the forecast period end, the less risk of getting the forecast wrong. If the bid date is very close to the year end, less work and management time is necessary to bring out a forecast. The finding that bid horizon was significantly shorter for forecasters is therefore to be expected.

It is not surprising that more profit forecasts are disclosed in the competitive environment of contested bids, when managements on both sides are defending their performance and are attacking the other side's performance. Disclosure in contested bids may be motivated by considerations of the direct effect of the information in the forecast, and by other indirect effects of disclosure.

Purchase consideration was expected to be very influential on bidders' disclosure decisions. In cash bids, there seems little reason for bidders to disclose forecasts, and it is hard to see how forecasts by bidders would be influential except in exceptional circumstances. A forecast was only disclosed in four cash bids: either because shares were separately issued to raise cash for the bid or because of the contested nature of the bid.

Bivariate results shown in Tables 5 and 6 on the full sample are very different from multivariate results: size, substantial shareholdings, listing status and nationality were significantly different in bivariate analysis for forecasters and non-forecasters, yet in multivariate analysis none of these variables were significant. This could be due to missing values resulting in omission of unquoted and foreign bidders from multivariate analysis.

When the bivariate analysis is re-run using the same samples as in Table 7 (i.e. 192/316 cases) the bivariate and multivariate results are consistent.

### 6.1. *Comparison with previous research findings*

Ruland (1979), Cox (1985), Lev and Penman (1990), Clarkson, Kao and Richardson (1994) and Frankel, McNichols and Wilson (1995) (for utilities only) found size to be significantly different between forecasters and non-forecasters. No significant difference in size between the two groups was found by Waymire (1985). In the bivariate analysis in this study, forecasting bidders were significantly smaller than nonforecasting bidders, contrary to expectations. This may be because bidders are generally large firms (on average larger than targets). In multivariate models size was not significant. Thus, once other factors were conrolled for, size did not generally explain differences in forecasting.

Ruland, Tung and George (1990) found ownership structure to be the most important variable in multivariate analysis explaining voluntary disclosure of forecasts. There was no support for percentage management ownership as an explanation of forecast disclosure in this research.

The findings in this research for bid horizon are opposite to those in Waymire (1985). Waymire found that the forecast horizons for regular repeat forecasters were longer than for non-repeat forecasters. In addition, he found that earnings of repeat forecasters are significantly less volatile than non-repeat forecasters. Waymire suggests that non-repeat forecasters, with highly volatile earnings, disclose forecasts closer to the year end to reduce the risk of making an erroneous forecast. In this research, bid horizon for forecasters is, as one would expect, shorter than for non-forecasters.

### 6.2. *Influence of news*

Bivariate and multivariate results support the hypothesis that forecast disclosure is more likely when there is good news to report. Of the forecasts disclosed, more were good news forecasts although there were a sizeable minority of bad news forecasts.

These results must be interpreted with caution for two reasons. First, there were only 212 cases available for analysis. Bidders tend to be larger firms, with PR departments, and may be better at guiding market expectations through analysts' forecasts. Thus, market expectations are less likely to be out of line for bidders, who are less likely therefore to disclose a forecast.

### 6.3. *Other issues*

Analysis showed that all bidder forecasts were met. Actual results were generally within 10% of the forecast.

As motives for disclosure are quite different for bidders and targets, explanators of disclosure differed somewhat. For both bidders and targets, forecast disclosure is more likely in contested bids and with shorter bid horizons (in agreed bids only for targets). Purchase consideration is a significant influence on disclosure for bidders, with more forecasts disclosed during paper bids. Large block shareholdings is an influence on disclosure for targets in contested bids. There is little evidence that disclosure of a forecast by one party is influenced by disclosure by the other party to the bid.

### 6.4. *Suggestions for further research*

This research focusses on what motivates management to disclose forecasts. A shareholder perspective is an alternative approach. Share price behaviour before/after takeovers could be examined to identify whether share prices differed where forecasts were disclosed. There are difficulties, however, with share price studies. Share prices will not be available if the share quotation has been suspended during takeover. There may be so many other events occurring during bids that it may be difficult to isolate share reactions as related specifically to disclosure of forecasts. Variability of newspaper coverage will also affect share prices.

Voluntary disclosure is one potential management response to valuation problems in public markets. Further research is needed to understand which voluntary disclosures are credible, and how voluntary disclosure affects analyst and institutional investor interest in the firm. Usefulness to recipients of the information disclosed in profit forecasts, and the format of its disclosure, could be examined.

An additional issue to consider is whether analysts follow forecasts disclosed. The change in analysts' forecasts (including the direction of change) as a result of disclosure could be examined. If analysts' forecasts do not move toward managements' forecasts, this would suggest that managements' forecasts are not useful.

Because the findings of the research are specific to the takeover context of the study and may not apply to non-takeover situations, future research might examine forecast disclosures in other contexts to re-examine some of these findings. The dominance of the takeover context on the results suggests that more research is needed to study disclosures in specialist settings.

**Appendix 1**
**Classification tables**

|  | *Table 7 Full model* |  |  | *Table 7 Reduced model* |  |  |
|---|---|---|---|---|---|---|
|  | *Predicted* |  |  | *Predicted* |  |  |
| Observed | *No.* | *No.* | *% correct* | *No.* | *No.* | *% correct* |
| No disclosure | 165 | 5 | 97.06 | 278 | 4 | 98.58 |
| Disclosure | 15 | 7 | 31.82 | 29 | 5 | 14.71 |
|  | **180** | **12** | 89.58 overall | **307** | 9 | 89.56 overall |

|  | *Table 10 Full model signed ME* |  |  | *Table 10 Reduced model signed ME* |  |  |
|---|---|---|---|---|---|---|
|  | *Predicted* |  |  | *Predicted* |  |  |
| Observed | *No.* | *No.* | *% correct* | *No.* | *No.* | *% correct* |
| No disclosure | 91 | 3 | 96.81 | 160 | 3 | 98.16 |
| Disclosure | 4 | 9 | 69.23 | 14 | 7 | 33.33 |
|  | **95** | **12** | 93.46 overall | **174** | **10** | 90.76 overall |

## References

Ajinkya, B. and Gift, M. (1984). 'Corporate managers' earnings forecasts and symmetrical adjustments of market expectations'. *Journal of Accounting Research,* 22 (2): 425–444.

Baginski, S.P., Hassell, J.M. and Waymire, G. (1994). 'Some evidence on the news content of preliminary earnings estimates'. *Accounting Review,* 69 (1): 265–273.

Ball, R. and Foster, G. (1982). 'Corporate financial reporting: a methodological review of financial research'. *Journal of Accounting Research,* 20 (Supplement): 161–234.

Berkovitch, E. and Narayanan, M.P. (1990). 'Competition and the medium of exchange in takeovers'. *Review of Financial Studies,* 3 (2): 153–174.

Biddle, G.C. and Saudagaran, S.M. (1989). 'The effects of financial disclosure levels on firms' choices among alternative foreign exchanges'. *Journal of International Financial Management and Accounting,* 1 (1): 55–87.

Bradbury, M.E. (1992). 'Voluntary disclosure of financial segment data: New Zealand evidence'. *Accounting and Finance,* 32 (1): 15–26.

Brennan, N. (1998). *Disclosure of Profit Forecasts during Takeovers: Evidence from Directors and Advisors,* Edinburgh: Institute of Chartered Accountants of Scotland.

Brennan, N. (1999). 'Voluntary disclosure of profit forecasts by target companies in takeover bids'. *Journal of Business Finance and Accounting,* 26 (7/8): 883–917.

Carleton, W.T., Guilkey, D.K., Harris, R.S. and Stewart, J.F. (1983). 'An empirical analysis of the role of the medium of exchange in mergers'. *Journal of Finance,* 38 (3): 813–826.

Carmichael, D.R. (1973). 'Reporting on forecasts: A United Kingdom perspective'. *Journal of Accountancy,* 135 (1): 36–47.

Clarkson, P.M., Dontoh, A., Richardson, G. and Sefcik, S.E. (1992). 'The voluntary inclusion of earnings forecasts in IPO prospectuses'. *Contemporary Accounting Research,* 8 (2): 601–626.

Clarkson, P.M., Kao, J.L. and Richardson, G.D. (1994). 'The voluntary inclusion of forecasts in the MD&A section of annual reports'. *Contemporary Accounting Research,* 11 (1–II): 423–450.

Cooke, T.E. (1992). 'The impact of size, stock market listing and industry type on disclosure in annual reports of Japanese listed corporations'. *Accounting and Business Research,* 22 (Summer): 229–237.

Courtis, J.K. (1992). 'The reliability of perception-based annual report disclosure studies'. *Accounting and Business Research,* 23 (Winter): 31–43.

Cox, C.T. (1985). 'Further evidence on the representativeness of management earnings forecasts'. *Accounting Review,* 60 (4): 692–701.

Dev, S. and Webb, M. (1972). 'The accuracy of company profit forecasts'. *Journal of Business Finance,* 4 (3): 26–39.

Eckbo, B.E., Giammarino, R.M. and Heinkel, R.L. (1990). 'Asymmetric information and the medium of exchange in takeovers: theory and tests'. *Review of Financial Studies,* 3 (4): 651–675.

Ferris, K.R. (1975). 'Profit forecast disclosure: the effect on managerial behaviour'. *Accounting and Business Research,* 4 (Spring): 133–139.

Ferris, K.R. (1976). 'The apparent effects of profit forecast disclosure on managerial behaviour: an empirical examination'. *Journal of Business Finance & Accounting,* 3 (3): 53–66.

Firth, M.A. and Smith, A. (1992). 'The accuracy of profits forecasts in initial public offering prospectuses'. *Accounting and Business Research,* 22 (Summer): 239–247.

Fishman, M.J. (1989). 'Preemptive bidding and the role of the medium of exchange in acquisitions'. *Journal of Finance,* 44: 41–57.

Frankel, R., McNichols, M. and Wilson, G.P. (1995). 'Discretionary disclosure and external financing'. *Accounting Review,* 70 (1): 135–150.

Franks, J.R., Harris, R.S. and Mayer, C. (1988). 'Means of payment in takeovers: Results for the United Kingdom and the United States'. In: *Corporate Takeovers: Their Causes and Consequences.* Auerbach, A.J. (Ed.). Chicago: The University of Chicago Press: 221–263.

Frost, C.A. and Pownall, G. (1994). 'Accounting disclosure practices in the United States and the United Kingdom'. *Journal of Accounting Research,* 32 (1): 75–102.

Gray, S.J., Roberts C.B., and Gordon, P.D. (1991). *Making Corporate Reports Valuable: A Survey of Corporate Reporting Practices by Major UK Companies.* Glasgow: Institute of Chartered Accountants of Scotland.

Great Britain (1985). *Companies Act 1985.* London: Her Majesty's Stationery Office.

Jaggi, B. (1978). 'Comparative accuracy of management's annual earnings forecasts'. *Financial Management,* (Winter): 24–32.

Jensen, M.C. and Meckling, W.H. (1976). 'Theory of the firm: managerial behaviour, agency costs and ownership structure'. *Journal of Financial Economics,* 3: 305–360.

Kanji, G.K. (1993). *100 Statistical Tests.* London: Sage Publications.

Kasznik, R. and Lev, B. (1995). 'To warn or not to warn: management disclosures in the face of an earnings surprise'. *Accounting Review,* 70 (1): 113–134.

Keasey, K. and McGuinness, P. (1991). 'Prospectus earnings forecasts and the pricing of new issues on the unlisted securities market'. *Accounting and Business Research,* 21 (Spring): 133–145.

Leftwich, R., Watts, R. and Zimmerman, J. (1981). 'Voluntary corporate disclosure: the case of interim reporting'. *Journal of Accounting Research,* 19 (Supplement): 50–77.

Lev, B. and Penman, S.H. (1990). 'Voluntary forecast disclosure, non-disclosure and stock prices'. *Journal of Accounting Research,* 28 (1): 49–76.

Limmack, R.J. (1991). 'Corporate mergers and shareholder wealth effects 1977–1986'. *Accounting and Business Research,* 21 (Summer): 239–251.

London Stock Exchange (1997). *The Listing Rules.* London: London Stock Exchange.

Malone, D., Fries, C. and Jones, T. (1993). 'An empirical investigation of the extent of corporate financial disclosure in the oil and gas industry'. *Journal of Accounting, Auditing and Finance,* 8 (3): 249–273.

McCullagh, P. and Nelder, J. A. (1989). *Generalised Linear Models,* 2nd ed. London: Chapman and Hall.

McNichols, M. (1989). 'Evidence of informational asymmetries from management earnings forecasts and stock returns'. *Accounting Review,* 64 (1): 1–27.

Milgrom, P. (1981). 'Good news and bad news: representation theorems and applications'. *Bell Journal of Economics,* 12: 381–391.

Norusis, M.J. (1994). *SPSS Advanced Statistics 6.1.* Chicago: SPSS Inc.

Panel on Takeovers and Mergers (1993). *The City Code on Takeovers and Mergers.* 4th ed. London: The Panel on Takeovers and Mergers.

Patell, J.M. (1976). 'Corporate forecasts of earnings per share and stock price behaviour: empirical tests'. *Journal of Accounting Research,* 14 (2): 246–276.

Penman, S.H. (1980). 'An empirical investigation of the voluntary disclosure of corporate earnings forecasts'. *Journal of Accounting Research,* 18 (1): 132–160.

Pownall, G., Wasley, C. and Waymire, G. (1993). 'The stock price effects of alternative types of management earnings forecasts'. *Accounting Review,* 68 (4): 896–912.

Pownall, G. and Waymire, G. (1989). 'Voluntary disclosure credibility and securities prices: evidence from management earnings forecasts, 1969–1973'. *Journal of Accounting Research,* 27 (2): 227–245.

Ruland, W. (1979).'The time series of earnings for forecast reporting and non-reporting firms'. *Journal of Business Finance & Accounting,* 6 (2): 187–201.

Ruland, W., Tung S. and George, N.E. (1990). 'Factors associated with the disclosure of managers' forecasts'. *Accounting Review,* 65 (3): 710–721.

Schipper, K. (1981). 'Discussion of voluntary corporate disclosure: the case of interim reporting'. *Journal of Accounting Research,* 19 (Supplement): 85–88.

Securities and Exchange Commission (1977). *Report of Advisory Committee on Corporate Disclosure.* Washington, D.C.: US Government Printing Office.

Skinner, D.J. (1994). 'Why firms voluntarily disclose bad news'. *Journal of Accounting Research,* 32 (1): 38–60.

Sudarsanam, P.S. (1995). *The Essence of Mergers and Acquisitions.* Hemel Hempstead: Prentice Hall International (UK) Limited.

Travlos, N.G. (1987). 'Corporate takeover bids, methods of payment and bidding firms' stock returns'. *Journal of Finance,* 42 (4): 943–963.

Waymire, G. (1984). 'Additional evidence on the information content of management earnings forecasts'. *Journal of Accounting Research,* 22 (2): 703–718.

Waymire, G. (1985). 'Earnings volatility and voluntary management forecast disclosure'. *Journal of Accounting Research,* 23 (1): 268–295.

Westwick, C.A. (1972). 'Profit forecasts in bid situations'. *Accountancy,* 83 (July): 10–16.

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# Cost accounting in the shipbuilding, engineering and metals industries of the West of Scotland, 'The Workshop of the Empire', c1900-1960

**A.I.M. Fleming, S. McKinstry and K. Wallace***

**Abstract**—This article examines the nature, use and development of costing systems employed in the shipbuilding, engineering and metals industries of the West of Scotland between the years c1900-1960. The research is for the most part archivally-based, and is founded on the surviving records of 11 firms across the sector. The sector's business history is outlined, the systems in use are then examined firm by firm, after which general conclusions are drawn about their common characteristics. Most were job or contract-based cost systems, in which rudimentary absorption techniques for overheads were applied, estimates were compared progressively with actuals and the control of departmental overhead expenditure was broadbrush. Cost accounting development within the sector is next examined, in particular the rejection of standard costing and budgetary control. This is linked with scepticism which existed about the relevance of Taylorism and Scientific Management to the area's industries, and also with the fragile industrial relations climate which prevailed over much of the period and which caused some firms to avoid payment by results remuneration systems. An engineering culture among management may also have inhibited the development of costing. The costing systems which were employed are assessed as having been adequate. The article concludes by suggesting that the factors identified as inhibiting costing development may well apply in future studies of the history of cost accounting in the UK.

## 1. Introduction

While much has been written on the business history of the engineering-related industries of the West of Scotland (see for example Payne, 1979, 1992; Peebles, 1987; Reader, 1971; Slaven, 1980), little consideration has as yet been given to the cost accounting systems and techniques employed by firms within this sector. Given its economic importance at both a national and regional level and also the substantial volume of accounting records that it has left, research into its costing practices is a potentially fruitful source of insights into the history of cost accounting in Britain.

The historical investigation of the development of cost accounting[1] in the UK, until fairly recently, has paid a great deal of attention to the period prior to 1900. Much academic energy and archival research has been devoted to evaluating the contribution of the Industrial Revolution to the development of costing practice, leading to the generally accepted conclusion that early writers such as Pollard were incorrect in assuming that little was achieved during this period. Academic developments in this area have recently been summarised by Fleischman and Tyson (1993). Costing during the latter part of the 19th century has also been examined in some depth. For example, Boyns and Edwards concluded from their studies of coal, iron and steel company records from that period that there was much sophistication in costing practice, notably in the areas of departmental cost calculation, the apportionment of overheads and the integration of cost and financial accounts (Boyns, 1993; Boyns and Edwards, 1997). Post-1900, investigations are at an early stage, and, as yet, relatively little is known of the workings and development of costing practices in the 20th century.

This study has three aims: firstly, at the level of basic empirical fact, it will attempt to establish

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[1] The terms 'cost accounting' and 'cost accountancy' are used interchangeably in this article to denote the use of cost-based information for management control purposes.

what cost accounting systems were in use and, as far as possible, how they were used by management. In this context, cost accounting is defined as the collection and presentation of cost-based financial information as an aid to managerial decision-making and control. A second avenue of inquiry relates to recent attempts in the accounting history literature to chart the origins and progress of standard costing and budgetary control in Britain, most notably those of Boyns (1998a, 1998b). This author, drawing on studies such as Locke (1979, 1984), Loft (1986, 1990) and Quail (1997), has produced evidence, in the form of lists of companies, that these techniques were more widespread in Britain than was originally thought. Drawing on contemporary literature from the period, he found that substantial numbers of firms had adopted one or both of them from the 1920s onwards. Boyns concluded that more archival evidence was required before generalisations about the process of implementation, use and effectiveness of such systems in Britain could be reached. By means of a sample of key firms, this study will attempt to establish the extent to which these newer cost accounting techniques managed to penetrate the engineering-related industries of the West of Scotland.

A third, but related line of inquiry, concerns the current interest in the diffusion of Taylorism and the Scientific Management movement to which it gave rise in the US and the UK, as exemplified in papers by Fleischman (1999), or Fleischman and Tyson (1998). These point out that Scientific Management, which promoted the associated techniques of standard costing and budgetary control, was not taken up in the US as widely or as early as was first thought (Sowell, 1973; Epstein, 1978). This paper will draw attention to the fact that standard costing and budgetary control hardly made any impact at all in the engineering-related industries of the West of Scotland and that this, too, was correlated with the non-adoption of Scientific Management. It points out that if the latter was not embraced, the former were unlikely to be implemented. The paper goes on to propose reasons for the non-adoption of Scientific Management, standard costing and budgetary control in the West of Scotland's engineering-related industries. In particular, the one-off contractual nature of the work undertaken by most firms was seen as a problem within the sector. Other contributory factors were the industrial relations situation on 'Red Clydeside' and the existence of alternative financial systems, such as comparisons with estimate, which acted as a rough proxy for budgetary control.

The study is also concerned with the effectiveness, or adequacy, of the various costing systems and attempts to assess this factor. Broadly speaking, it is suggested that while the systems looked at did not generally encompass standard costing or budgetary control, when viewed in context they appear to have provided reasonably adequate, if in some ways broadbrush, cost control.

The paper begins with a short scene-setting sketch of the sector's business history, followed by a firm-by-firm description of the main features and workings of the systems selected for scrutiny. The questions of the non-development of standard costing and its links with the slow spread of Taylorism in the sector will next be addressed, followed by an assessment of the effectiveness of the systems found. Finally, the implications of the study for future research will be indicated.

## 2. The sector's business history

As Payne has observed, the engineering, shipbuilding and metals industries of the West of Scotland came to show a considerable degree of interdependence, which reflects their origins and pattern of evolution (Payne, 1992: 23). Iron (and subsequently steel) expanded capacity and output dramatically from the 1830s onwards, helped by the discovery of 'hot blast' smelting and the initial availability of local ores. This at first led to the export of pig iron, but later took advantage of the development and expansion of railways, which also provided impetus for firms producing railway tracks, locomotives, rolling stock, bridges and other related engineering products. By the late 1850s, the twin technologies of iron ship construction and steam marine propulsion brought the Clyde to the fore in these industries, so that by 1870, 70% of all British iron tonnage and two-thirds of all steam tonnage had been launched there. Very soon, iron was replaced by steel. The invention of steel water tube boilers, improved pumps and more efficient forms of marine steam engine brought about their local production and dynamised the industries concerned. In addition, successful firms producing in fields such as sugar machinery and in structural engineering grew up. A host of very small, diversified general engineering workships also emerged to supply the larger firms with jobbing work.

By the early part of the 20th century, a great deal of the above activity had become export-focused, especially on the countries of the British Empire, themselves beginning to industrialise and calling for much of the capital equipment needed from plants in the West of Scotland. One recent history of the area's industry has dubbed it, with some justification, 'The Workshop of the Empire' (Hume and Moss, 1977). By the eve of the First World War, however, intense competition from the North East of England was challenging the prominence of Clydeside shipbuilding and causing profit erosion. The most profitable business came from warship building, which was conducted on a 'cost-plus' basis, but this depended on fleet replacements or the periods of rearmament prior to and during the two World Wars (Payne, 1992: 39).

Before the First World War, the motor industry had started in the West of Scotland, but by 1930 this had shrunk to only one firm of lasting significance, Albion, which produced trucks. Another business of note which had developed well by this time was the manufacture of coal cutting machinery, the most successful firm in this field being Mavor and Coulson of Glasgow.

The 'Workshop of the Empire' had two major drawbacks: a large proportion of its manufactures were capital goods, the demand for which was notoriously cyclical, and a great deal of its output was shipyard-dependent. This had implications for demand in the metal-producing industries, and knock-on effects on many related industries, such as coal, which affected demand in those industries supplying capital goods to the coal industry. The depresssions between the two World Wars consequently took their toll across the West of Scotland. After World War Two, once pent-up demand in the Empire's markets had been fulfilled, a number of factors began to weaken the industry of the West, causing it to go into permanent decline. These included the build-up of indigenous industry in traditional markets, such as India, which severed its political dependency on Britain and loosened its trade relations as well. There was also a loss of leadership in shipbuilding, where a shift by international competitors to the modular production of standardised vessels and a collateral failure to expand capacity in Britain at the right time ushered in decline and government-sponsored rationalisation, which failed to stave off collapse (Payne, 1992: 40; Slaven, 1980).

The census of 1931 reveals that engineering, shipbuilding and metals accounted for 280,320 out of a total of 2,221,375 Scottish jobs (12.6%) (1931 Census). The figures for 1951 were 263,672 out of 2,194,701 (12%). In both years, the sector was by far the largest employment grouping, its nearest rivals in 1931 being agriculture, 7.9%, and textiles 6.9%. In 1951 these sectors stood at 7.4 and 5.4% respectively (1951 Census).

## 3. The archival research

In selecting cost accountancy archives for analysis, the preferred approach would have been to aim for a stratified sample, based on an identification of the relative size of firms and industries within the sector as judged by some criterion such as employment or sales values. This proved to be a problem, since some company archives have survived patchily, some contain little or no cost accountancy data, and in any event neither an employment nor a sales breakdown was available as a basis for selection. This difficulty led the researchers to seek firms that were broadly typical of the large business which dominated the sector and the small firms which often supported them, and for which adequate records survived. For this purpose, all known archives of firms within the sector were considered for inclusion.[2] As was indicated earlier, steel and shipbuilding firms were major players. The bulk of employment in these industries was concentrated in a small number of very substantial firms, some of which have left helpful if patchy records. Colvilles was a natural choice to represent iron and steel. By the 1930s, through expansion and takeover, it accounted for 80% of Scottish output, and key elements of its cost accounting records survive. John Brown's was chosen to represent shipbuilding. It was one of the largest two shipyards on the Clyde, the other being Fairfields. Both firms have left large quantities of costing records, but Brown was preferred because of the survival of extensive board papers.

Railway locomotive manufacturing was the province of a single large firm, North British Locomotive, which was the biggest producer in Europe, and which has left plentiful costing records. The same rationale applied in selecting Albion, by 1930 the only surviving representative of the Scottish motor industry, producing trucks with 3,000-4,000 employees over the period. It has left evidence of its main costing activities. Some difficulty was encountered with the two largest firms which made boilers and pumps, Babcock and Wilcox and J & G Weir respectively. These were the largest employers in each field, were the only firms in the field to have left records, but in both cases these are far from complete. It was nevertheless decided to use what was available, given the economic importance of the firms and their links with the metals and shipbuilding industries of the area, and in view of the fact that a broad picture can be drawn from what survives.

The dependence of the iron and steel industry, in particular, on coal led to several manufacturers of coal cutting machinery springing up and becoming an integral part of the sector. The two main firms were Mavor and Coulson and Anderson and Boyes, both of which employed substantial numbers of people. Mavor and Coulson was the larger firm, and while it has left no costing records, several published papers which reveal key elements of its costing practices survive. Anderson and Boyes have left no records, making Mavor and Coulson the only option.

The West of Scotland was also the home of Britain's largest and must successful builder of railway bridges, Sir William Arrol Ltd. Arrol's costing archives are less than complete, but reveal key aspects of its operation. Another West of Scotland business always mentioned in the standard accounts of the sector's history was the manufacture of sugar machinery. Only one firm, Mirrlees Watson, has left any costing records, and these were used. As was indicated above, the sector also spawned a number of smaller engineering firms which acted as subcontractors to the larger firms and also completed home and export work in their own right. Two such firms, William Baird and Sons and Fullarton, Hodgart and Barclay were chosen on the basis that they fitted this description and had left some details of their accounting operations pertinent to the issues being examined.

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[2] The largest repository of historical business records in Scotland is Glasgow University Business Archives, which was extensively consulted. The holdings at the Scottish Record Office, Edinburgh, and Strathclyde Regional Archives, were also utilised.

It was recognised at the outset that the lack of a complete picture of costing activities for the chosen firms was perhaps inevitable, but that a partial picture was better than none, provided the conclusions reached were qualified appropriately. As Table 1 reveals, the chosen firms account for about one third of employment in the sector.[3]

### *3.1. Shipbuilding*

For the reasons given above, John Brown's shipyard, Clydebank, was selected as a proxy for the shipyards of the Clyde. Brown's has the added advantage of being the best-known of the Scottish yards and having built the world famous 'Queens'.[4]

The main components of its cost accounting system relate to the costing of each ship in construction, which was the subject of its own contract. Ship costs were divided into three parts, Hull, Boilers and Engine, each of the three elements having its own cost book, into which monthly costs for direct wages and materials were entered for all ships in progress (Cost Books UGD 1/80/6, UCS 1/85/27, UCS 1/79/6, UCS 1/78/3). Each month the totals in these three books were transferred to a Manager's Progressive Cost Book for each ship, which contained cumulative totals of direct cost (Cost Book, UCS 1/7/272). At the summit of this system was the Comparison of Cost and Estimate Book, where the cumulative totals of Hull, Boilers and Engine costs for each vessel were compared monthly with the ship's contract estimate, showing overestimates and underestimates to date and for the whole life of the contract (Cost Book, UCS 1/86/138). Prime Cost only was taken into account. Four times each year this information was summarised in a book entitled 'Contract Costs, etc' in which cash and bills received for each vessel were recorded and where General Charges (Overheads) included in the contract price were stated in total (Cost Book, UCS 1/75/11).

Lying behind these major components of the cost system was a detailed wages analysis book, which carefully separated weekly wages costs by Hull, Boilers and Engine, direct workers and those to be debited to 'charges' (overheads), class of workman and whether piece work-based or time-based (Wages Book, UCS 1/54/101-1051). A full chart of accounts and detailed instructions for the recording of material issues and receipts against major categories of cost was available for consultation. Supervisory management and stores staff were responsible for a system of 'lines' which tracked workforce and material movements at an individual level (Instructions, UCS 1/3/47).

There therefore existed a system that enabled the tracking of cost versus estimate at prime cost level on a progressive basis as contracts proceeded. As far as General Charges are concerned, these were examined in a more holistic way. It is clear that contract prices for ships were established in the light of estimated annual General Charges. If a yard was not fully occupied with vessels in each berth, it was difficult to recover the necessary expenses associated with under-utilised capacity, and indeed, contracts were sometimes taken at prices which allowed for little more than prime cost (Peebles, 1987).

John Brown's monthly Board Minutes, available from 1910 until its nationalisation in 1968, suggest that 'financial' discussions tended to centre on cash receipts, payments, forecast and bank position, intensifed in the slack periods between the two World Wars. Capital expenditure requirements were also discussed under this heading and occasionally, in the post-World War Two period, intended alterations to bonus schemes. The Board Minutes are devoid of references to the costing records and General Charges (Minutes, UCS 1/1/1). A series of ad hoc Board Papers, supplied as supplementary information, do however contain notes on the progress of contracts, competitive tender details from Brown's own suppliers and occasionally forecasts of General Charges compared with annual estimates (Board Papers, UCS 1/2/1-2). Measures taken to reduce these, through the 'curtailing' of non-producing labour, are also discussed. Each year-end, for balance sheet purposes, incomplete contracts were assigned a share of General Charges, calculated as a proportion of direct labour cost, and for cost record purposes, complete contracts were assigned a final tally of General Charges, enabling a final profit to be worked out. The board minutes make no reference to the laboriously produced and physically large

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[3] The firms examined included all of the largest industrial employers in the West of Scotland, with the exception of Singer, Clydebank, which employed up to 16,000 as late as 1960. Its cost records do not appear to have survived.

[4] An examination of the records of Fairfields, Dennys of Dumbarton and Scotts of Greenock reveals very similar costing systems. Brown's therefore acts as a proxy for firms that, collectively, sometimes employed 40,000 people.

**Table 1**
**Summary of Firms, Cost and Payment Systems**

| *Company* | *Business* | *Indicative No. of Employees* | | *Period of Existence* | *Payment System* | *Type of Cost* |
|---|---|---|---|---|---|---|
| John Brown | Shipbuilding | 1950s- | 8/11,000 | 1899-1970 | Piecework (Direct) | Contract cost |
| North British Locomotive | Railway locomotives | 1931- | 1,345 | 1903-1962 | Piecework (Direct) | Contract cost |
| Albion Motors | Trucks | 1940s-<br>1950s- | <br>3,000 | 1900-present | Group Output Bonus (Direct) | Unit cost per vehicle |
| Colvilles | Steel | 1930s- | 30,000 | 1861-1968 (later British Steel) | Area Output Bonus (Direct) | Process costs per ton |
| Babcock & Wilcox | Boilers | 1959- | 10,000 | 1891-present | N/A | Contract cost |
| J & G Weir | Pumps | 1913-<br>1922- | <br>3,000 | 1866-present | Halsey-Weir Bonus Scheme (Direct) | Contract cost |
| Mirrlees Watson | Sugar machinery | 1920s- | 800 | 1848-1960s | N/A | Contract cost |
| Wm Baird & Sons | General engineering | 1928-1950 | 100 throughout | 1928-1950 | Basic time | Contract cost |
| Fullarton, Hodgart & Barclay | General engineering | 1928-<br>1950- | 116<br>129 | 1890-1940 | Basic time | Contract cost |
| Mavor & Coulson | Coal cutting machinery | 1940s- | 3,000-4,000 | 1881-1968 | Individual payment by results | Contract cost |
| Sir William Arrol | Structural engineering | 1950- | 1,820 | 1868-1972 | N/A | Contract cost |

cost books, but these were quite obviously the source of some of the information in the board papers. The cost books would also be available to estimators preparing new tenders. The system remained essentially unchanged from the firm's inception in 1899 to its nationalisation in the 1960s. Just prior to this, there was an increasing use of graphs in board papers relative to total overhead expenditure and recovery, but no basic change.

How typical was John Brown's system? As McLean points out, sophisticated contract cost accounting was widespread throughout British shipbuilding by the end of the nineteenth century (McLean, 1995: 110). It developed in complexity as ships became more complex and more overhead expenditure was required to engineer them and handle the increasing administrative work involved (McLean, 1995: 116). All the major Scottish shipyards had well-developed contract cost systems, the main area of difference between them being, unsurprisingly, in the area of overhead absorption. For example, while Brown used a direct labour-based rate, Fairfields of Govan used annual turnover (Accounting System, UCS 2/30/1).

### *3.2. Railway locomotive manufacture*

The firm chosen to represent railway locomotive manufacture is the North British Locomotive Company Ltd of Glasgow (NBL). NBL was Europe's largest locomotive manufacturer, and was formed in 1903 on the merger of Glasgow firms Dubs, Sharpe Stewart and Neilson Reid. The firm produced some 24,000 locomotives to 1962, when it collapsed. It failed to make the transition from steam to non-steam forms of traction, and its final phase has recently been subjected to detailed scrutiny (Fleming, McKinstry and Wallace, 1999). NBL's principal customers were in the countries of the British Empire, especially India and South Africa, but it exported elsewhere and had produced locomotives for British railway companies, which had a tradition of manufacturing the bulk of their own locomotives. NBL tended to sell on the basis of fixed price contracts.

Its management accounting system revolved around the maintenance of contract cost records in a manner not too dissimilar to shipyard costing. The principal record was the Cost and Weight Book, one of these being maintained for each locomotive contract (Cost Book, UGD 11/5/2/1). Each major component of the locomotive was preprinted down the left hand side of the page, for example, Boiler, Firebox, Grate, Tubes, Fire Door, Safety Valve, Regulator, etc, and across the top of the page, wages cost against each component was collated by department, for example, Smithy, Boiler Shop, Furnaces, Patterns, Iron Foundry. Alongside this columnar analysis of wages per component for the contract was material cost per component, initially listed for each engine, but grossed up to total contract where more than one was involved. This information was progressively assembled from subsidiary material and wages records until the contract cost was collected in full '*ex post facto*'. Total locomotive weights were also collected in these books to ensure that maximum axle loading criteria were not exceeded.

Comparisons with the estimated cost on which the selling price of the contract had been based were not made until the contract was complete, unlike shipyard costing. This is likely to have been considered unnecessary and impracticable because of the relatively short time taken to fulfil a contract, which, depending on the order position, could be completed in anything from a few weeks onwards. A contract book was kept for this purpose, giving full details of the customer, date of contract, delivery promise, delivery achieved, payment terms, contract price, 'ascertained cost' and profit or loss (Contract Book, UGD 11/0/1-2). These latter details could not be calculated until the end of the financial year in which the contract was fulfilled, for only then was it possible to include an 'actual' share of 'oncost' with each contract. This meant that in periods of slack demand, completed contracts bore the under-recovered oncost. Incomplete contracts, unlike shipyard contracts, were not assigned a share of oncost. Comments in directors' reports make it obvious that the effects of volume on overhead costs per unit were well understood (Directors' Reports, UGD 109/2/8-27).

Oncost rates were based on allocation of overheads to each major production area, and absorbed on a percentage basis by labour cost both for pricing, which was carried out by engineering-trained estimators, and for the calculation of 'ascertained costs'.

At NBL, no budgeting, standard costing or marginal costing was done. Furthermore, costs were not analysed by department or works. Around 1960, when the firm was in terminal decline and run by directors appointed by the principal lenders, a simple form of budgeting was hastily introduced (Financial Statements, UGD 11/14/1). This covered sales and profits at a company-wide level only. It is clear from the positioning of the cost office in close physical proximity to the board room in the firm's Springburn head office that cost information was seen as important, and it would undoubtedly be used in obvious ways at its more-or-less monthly board meetings.

Qualified accountants did not feature in the company's staffing until the 1940s, when Sir Andrew Macharg CA joined as finance director on a part-time basis. Macharg at one time held 14 part-time board posts in Scotland, and is unlikely to have been able to take a detailed interest in accounting development at NBL. Certainly, as at John Brown's, its systems remained essentially unchanged from start to finish, although qualified accountants were involved in senior management posts from the 1950s onwards.

### *3.3. Motor vehicles*

Out of the 50 or so motor manufacturers that started up in Scotland before the First World War only three, the West of Scotland-based Argyll, Arrol-Johnston and Albion companies, managed both to produce on a relatively large scale and to exist for a long period of time (Saul, 1962). By 1930, Argyll and Arrol-Johnston had disappeared, leaving Albion, since 1913 a producer of commercial vehicles only, as the sole substantive concern in the industry. From its Glasgow base, Albion sold throughout Britain and the British Empire, with particular strength in Australia and South Africa (McKinstry, 1991). It maintained depots for spares and repairs in all its major markets. Albion merged with Leyland Motors in 1951, maintaining a semi-autonomous existence until 1968, the year Leyland merged with BMC to form British Leyland.

From its earliest years, it is known that Albion calculated vehicle unit costs for profit monitoring purposes. While none of these have survived, thanks to the company's policy of destroying the records within a year of origination, they are referred to in board minutes. These '*ex post facto*' costs were calculated for new vehicles once they were designed, and updated to reflect actual movements thereafter, for comparison with selling price. Material, Labour and 'Oncost' (the term most favoured in Scotland for overheads) were each calculated separately, and a direct labour-based rate was used to build oncost into vehicle costs. The relationship between labour and oncost was kept under review by comparing actual labour and overhead ratios with the chosen rate. It tended to be kept constant over long periods of years, and was used for stock accounting. More detailed 'ad hoc' rates were developed for subsidiary purposes, such as the calculation of spares and repairs prices, which were based on 'cost-plus'. The Albion accounts were 'integrated' in the sense that labour, material and oncost were charged to the stock account, while the cost of goods sold reduced its balance, which was compared with the physical stock for accounting purposes once a year (McKinstry, 1999).

The cost department at Albion was also involved in wages analysis, especially after bonus schemes were introduced in the late Edwardian era. Batches of components produced on the shop floor were allocated 'allowed times' for bonus purposes, and these were compared with actual time taken per batch. Area and shop totals of these times were taken for purposes of bonus calculation, efficiency monitoring and vehicle cost calculation.

As with John Brown's, the company's board minutes suggest that costing information was not used much by Albion's technologically-oriented directors, the main exception being in pricing discussions. 'Allowed' and 'actual' time data, prepared in the Cost Department were, however, extensively used by the works manager (who was a director) to monitor labour productivity. Between the years 1902 and 1914, when Albion was a private company, commentary on financial matters was restricted to two main areas, the progressive issue and call up of share capital, and the annual accounts. By 1918, spares, repairs and turnover statistics were regularly discussed at board meetings. These details and ad hoc matters, such as the examination of cash flow during the more depressed years of the 1920s, formed the core of the board's financial discussions (BMT, Board Minutes).

These financial arrangements and accounting systems did not change in any material way until 1957, when Leyland asked Albion to introduce quarterly budgets for the plant's total financial results, and from 1968 when more detailed budgets and a crude form of standard labour costs, based on Albion's old bonus times, was introduced.

### *3.4. Iron and steel*

By 1921, David Colville & Sons Ltd (Colvilles), the firm selected for this study, was the dominant producer of iron and steel products in Scotland, responsible for about one half of Scottish output. It had started out in 1861 as a partnership and had grown rapidly at its new Dalzell Works in Motherwell from its opening in 1881. Its Siemens process steel found ready markets both abroad and in the shipyards of Clydeside (Payne, 1979:1-41). By 1920 Colvilles owned Fullwood Foundry, Clydebridge Steel Company, Glengarnock Works, Clyde Alloy Steel Company and Smith and McLean in addition to Dalzell Works, these other enterprises having been acquired in the previous four years. In 1920, 5,000 were employed at Dalzell, 3,000 at Glengarnock, 2,000 at Clydebridge, 1,500 with Smith and McLean and 6,500 in associated collieries, 18,000 men in all (Payne, 1979: 143). Payne, the company's historian, advises that the chairman, John Craig, was responsible for initiating costing and management information across the group (Payne, 1979: 335-360). The surviving reports, from 1921 onwards, indicate clearly that this was for the board of directors, although undoubtedly would be available to senior management below director level. Each month the board received a single Trading and Cost Report covering all the works. Sales of pig, plates, sections, tube, billets, ingots, slabs, bars, forgings and a range of lesser products were provided monthly, analysed by works. Gross profit was struck by works after the deduction of direct costs. Overheads ('establishment charges') were allocated by product line.

The basis of allocation has been lost, but depreciation was allocated as a separate category and annual estimates of other overheads were spread by product line as a lump sum, that is, treated as totally fixed in nature. Alongside these figures, output tonnages were reported by product line and total manpower figures for each works given. For the month reported, year over year comparisons were provided. In addition to this information, net selling prices per ton of each product were supplied and, most importantly, actual costs per ton of product (including charges and depreciation). The information was presented to the board in a well organised and concise report, initially of about six pages (Trading and Cost Reports, GD 464/3847 and 38/16/15).

The prehistory of this comprehensive, impressive and uniform system of reporting can be inferred from fragments of archival information: each of the works recently taken over had originally had small cost departments, as did Dalzell, formerly Colvilles' headquarters. From this nucleus the cost departments were expanded to support the supply of management information. As other works such as the Lanarkshire Steel Company and Hallside were added to the group in the 1930s, causing Colvilles Ltd (as it by then was) to account for 80% of Scottish steel output, the system of reporting was extended to incorporate these new works. Essentially, the type of management information provided to Colvilles' senior management did not change until well after the firm's nationalisation in 1967, nor did the costing systems on which it was based.[5] Standard costing was not introduced until the 1970s, as was departmental expense analysis.[6]

As to how this information was used, Payne characterises the Colvilles' directors as a 'hands on', even autocratic grouping, with the chairman very much in charge (Payne, 1979: 240-241). The subsidiaries were allowed to run with a degree of independence, but policy and finance were controlled on a group basis. From the first, David Colville had shown a great awareness of the need to reduce costs in a context of fluctuating fuel and raw materials costs and reducing steel plate prices from customers, an attitude that was continued by his successors. From the mid-1920's onwards, there were many government-sponsored exploratory talks between the chairmen of British steel companies and even consultants, which centred on industry rationalisation as a means of increasing competitiveness through the control of costs. Throughout these, Colvilles' directors were able to refer to their lower costs per ton of ingots, plates and sections, and on one occasion pointed to reductions in wages cost per ton achieved at Motherwell (Payne, 1979: 159-162).

Cost information therefore played a central part in both operational and strategic decision making. The process was assisted by the industry-wide practice of quoting all costs on a 'per ton' basis, which enabled intra-grouping comparisons as well as external comparisons to be made. At individual plant level, it was also standard practice for local management to keep very detailed production and yield statistics for production management purposes.

### *3.5. Land and marine boilers*

Babcock and Wilcox, the chosen firm in this category, was incorporated in New Jersey in 1881, granting a licence to Singer at Clydebank for the manufacture of its patent water tube boilers. A British company bearing the Babcock and Wilcox name was registered in 1891, with UK-based shareholders in control. A works was started at Renfrew near Glasgow in 1895, this plant making boiler shells while the tubes were made at nearby Dumbarton. Renfrew had its own foundry (Minutes, UGD 309/1/11/4).

Financial records are scant, but the firm expanded rapidly both in the home and export markets. By 1920 the firm had become one of the most successful in the West of Scotland. Output and tonnage dipped over the more difficult 1920s and 1930s, but substantial profits were still made. In the 1930s, over 80% of all British power station boilers were of Babcock manufacture. By this time the firm had several plants in England and some overseas. In the 1950s, Babcock's became deeply involved in nuclear power station work. Up to 1970, the firm remained consistently profitable, adapting its output to the changing technologies of the day. The company still exists today as Mitsui Babcock (Output Records, UGD 309/3/16/3).

The company's archival record is patchy, and contains little detail of its management accounting activities. It is clear, however, that Babock's has been concerned with 'one-off', tailor-made contracts since its commencement and sold mostly on a fixed price basis. As a surviving historical sketch puts it, it has been involved from the beginning in 'recording of costs of jobs at the various works to keep track of the actual as against the estimated expenditure [and] the allocation of these jobs to the different contracts' (Cost Records, UGD 309/1/11/1).

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[5] Information provided by Andrew Bell, employed by Colvilles from 1954 to 1984, latterly as Cost Office manager at Dalzell works, Motherwell. He was able to confirm that the costing system described only began to be altered substantially after nationalisation.

[6] Information provided by Bill Russell ACMA, employed as a Development Accountant at the British Steel Corporation's Glasgow Head Office in the early 1970s. He informed the authors that it was only then that Head Office accountants began to introduce standard costing and expense analysis at plant level.

As might be expected, job and contract prices were built up by engineer/estimators, working in close liaison with technical staff. Overhead charges were allocated to the major departments, then charged to jobs and contracts on a labour-based rate. Standard costs were developed for minor components of uniform design at some stage, but contract costing, with the comparison of estimates and actuals, still forms the core of its costing system. Evidence of budgets being employed is first found for 1962, but no details survive.

As well as the necessary monitoring of contract costs at each works, financial results were reported to the main board, which met in London. In 1930, a separate 'Executive and Finance Committee' was set up, again meeting in London. This dealt with a whole range of financial matters, covering the company's cash balances, amounts remitted to overseas operations, the discussion of quotations, capital purchases, the review of running expenses at the main works in Renfrew (where there was a works accountant by 1930 at the latest) and pensions. Little detail of how the organisation was run has survived, but enough is known at this stage to verify that it was a typical West of Scotland workshop-type capital goods producer, exporting heavily (just under half of output in 1939) (Minutes, UGD 309/1/7/1).

### 3.6. *Pumps and compressors*

The selected firm, J. & G. Weir, was started as an engineering consultancy in Liverpool in 1871. In 1886 Weirs set up a foundry in Cathcart, Glasgow, for manufacturing of marine pumps. By the turn of the 20th century, the firm had supplied boiler feed pumps for about 4,200 vessels (Reader, 1971: 1-17). By 1910, employment reached about 3,000. Losses were made in the post-war depression years 1920-25, when shipbuilding, the source of much of Weir's business, was in decline. Profits picked up steadily thereafter up to and beyond World War Two. The firm diversified its operations at several points: aluminium dwelling houses and, subsequently, conventionally constructed dwelling houses were built from the 1920s onwards, and Weirs also engaged in the production of Monel metal at this stage. It formed a holding company in the 1950s, and still operates successfully today.

Very little of Weir's accounting records have survived, but the following has been ascertained: Weir produced customised equipment, usually on fixed-price contracts, from the beginning. Jobs were priced on the basis of estimated material, labour and 'oncost', which was absorbed on the basis of labour. The firm was committed from 1898 onwards to a system of 'payment by results', and adopted the famous Halsey-Weir bonus system, where an employee was paid half the value of the time saved on a job.[7] The times were calculated on the basis of 'detailed work study', but this was not based on the fully fledged implementation of F.W. Taylor's 'Scientific Management', given that the Weir shops did not have a system of production control (which, as will be seen later, was an integral part of Taylor's approach) until 1921 (Reader, 1971: 31). At this point the production control department was given its own costing staff, for the comparison of time taken for jobs and batches of work versus time allowed. Some form of budgetary control was in existence by 1948. Contract costing and the comparison of actual costs with estimates has always lain at the heart of the company's cost system, as it does today. Standard costing was not introduced at Weirs, except at the foundry, where standard weights of small components made this possible, but this only affects a tiny fraction of output. The date of its introduction has been lost.[8] Finance was accorded increasing respect in the company's organisational structure with the passage of time: in 1944 J. Spittal, who had joined the main Weir company as cost accountant from its foundry in Thornliebank, was appointed to the main board (Reader, 1971: 137).

### 3.7. *Sugar machinery and general engineering*

The sugar machinery firm of Mirrlees Watson of Glasgow had roots as far back as 1848 and it lasted until the late 1960s, when the industry of which is was part finally collapsed (Hume and Moss, 1977: 34). It exported machinery, such as centrifugal separators, to customers in India, where it was particularly well established. South Africa and the Far East were added to its customer base, and in the late 19th century it employed up to 800 workers. Surviving job and quotations books confirm that the business, on the whole, produced bespoke machinery, and that pricing tended to be on a fixed basis with, at a later date, price escalation clauses to cover inflation (Job Books, UGD 62/2/1 and 62/3/1). This business too was an archetypal West of Scotland engineering firm where estimators built up costs, added 'on-

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[7] The Halsey-Weir system was described by Sam Mavor (1930) as 'the Weir adaptation of the Halsey system'. Halsey was an American engineer, but no details of how the company came to adopt the system survive. Wages under the system were calculated as follows:

$$\text{Wages} = \frac{\text{Time allowed} + \text{Time taken}}{2} \times \text{Rate}$$

[8] This information was provided by Alex Reid, at present management accountant at Weirs.

cost' and monitored actual costs against estimates thereafter.

The larger firms of the West of Scotland were complemented by a number of smaller firms which both completed subcontract work for them and also did work for their own end customers. Of these, William Baird and Sons Ltd of Anniesland, Glasgow operated as a fabrication shop from the earlier part of the century until about 1950, producing crane girders, structural steelwork and other small fabrications (Minute of Agreement, UGD 138/6/1). There were approximately 100 employees, and estimator/draughtsmen prepared prices, which were not checked against actual costs. The firm was run by a 'hands on' management which held few and irregular board meetings. Notwithstanding these informal arrangements, Bairds was generally quite profitable, except for the depression years of the 1930s. Two rates of oncost were applied to the firm's contracts, which were on a fixed price basis. The larger oncost rate was for fabrication, the other for erection, both based on past experience (Cost and Estimate Book, UGD 138/7/1).

Fullarton, Hodgart and Barclay of Paisley was a small engineering firm of a different type from Baird, although with a similar number of employees. Its roots extended backwards to an 1838 partnership which was incorporated in 1920. It made mine-winding equipment, compressors and pumps, inter alia (Records, UGD 120/3/4). As its small size suggests, it produced individualised work which was the subject of bespoke contracts, costed by engineer/estimators. This firm applied both 'works' and 'D & P' (Drawing and Planning) oncost to prices, and added an administration and selling charge to each price. Shop oncost examples of 92.2% of wages, 80.6% of 'D & P' wages, administration charges of 7.1% and sales charges of 1.3% have been found. It is clear these figures were subject to regular revision in the light of experience (Records, UGD 120/3/4). Standard costing was never developed, but the absence of financial accounting records from the archive makes it impossible to say whether budgets were used.

### *3.8. Coal cutting machinery*

The pre-eminent coal cutting machinery firm in Scotland was Mavor and Coulson of Bridgeton, Glasgow, subsequently also of East Kilbride. Sam and Henry Mavor started an electrical engineering firm in Glasgow in 1881 (Mavor and Coulson, 1929 and 1932b). By the early years of the new century the company had begun to specialise in coal cutting machinery which, in the years prior to 1914, was made on a bespoke basis for individual customers. By 1918, the company had to a large extent standardised elements of its products (Mavor, 1932a). As a mining-related industry, its fortunes to some extent reflected those of coal, which declined badly in 1921 and 1926. The firm sold extensively in the UK, on the Continent and to the countries of the Empire. Prior to 1923, it paid workmen on the Rowan bonus system, and afterwards, a mixture of Rowan bonus and its own bonus scheme. In the post-1918 period, Mavor and Coulson introduced full work measurement, together with rationalised factory layouts, making the company possibly the only Scottish engineering firm to have done both by this time. The techniques employed were based explicitly on F.W. Taylor's 'Scientific Management' (Mavor, 1931).

These innovations were not carried through to the firm's cost department. Machines were costed on the basis of material, labour and oncost, the latter based on a rate per £ of direct labour (Mavor and Coulson, 1932b). Costing was regarded as a matter of high importance to Mavor and Coulson's directors, who operated in a market where competition from the US and the Continent kept constant pressure on prices. Oncost at Mavor and Coulson was monitored with vigilance at board level, and amounted to £141,000 per annum for 'establishment charges' in 1932 (Mavor and Coulson, 1929). Little detail of the management accounting has survived, but standard costs were not developed by this time, although contract estimates were compared with actuals. The firm was involved in a series of mergers in a dwindling industry from the 1960s on, gradually losing its identity thereafter. At several points in its history it had employed over 3,000 people.

### *3.9. Structural engineering*

Sir William Arrol Ltd started up in 1868 as a boiler-making and engineering business, diversifying into bridge building and public works contracting. The firm's main works were at Dalmarnock, Glasgow. It soon demonstrated competence in large contracts, especially for railway bridges. The bridge over the Clyde at Glasgow Central Station (1878) was followed by the contract for the new Tay Bridge (1887) and afterwards, the Forth Bridge (1890), and the Tower Bridge, London. Arrol was Britain's pre-eminent bridge builder.

Some parts of the company's cost records have survived. The firm's work divided into two major categories, jobs involving manufacture and delivery only, and jobs involving manufacturing and erection. Cost abstract books indicate that cost estimates for jobs were prepared in three steps. Raw materials (taken in via Arrol's stores), finished materials and petty cash purchases were added together to give a Material total. Shop Wages for the Girder and Engineering Departments were combined, where each was involved, to give a Wages total. Next, Drawing Office costs were added. This category was split into Civil Engineering and Girder Departments. Shop Oncost, which covered all other site overheads, was added once Material, Wages and Drawing Office costs were totalled, implying that the rate used was based on prime cost. Where Site Work was involved, separate Wages, Oncost, Salaries and Insurance were estimated. Site Work oncost was proportionate to Wages (Cost Book, TD 208/19/1).

Contracts were quoted on a fixed price basis, but major jobs were quoted 'per ton'. In the latter case, the client would supply pro forma schedules of quantities which Arrol would cost for tendering purposes. These large contracts were controlled on behalf of clients by consulting engineers, who would authorise payment based on quantities completed. Costs and estimates were compared in an Estimate and Cost Book, and the system was backed up by detailed wages and materials analysis.

The company did not introduce standard costing at any stage, but a form of budgeting, which only involved estimates of profit at a company-wide level, was introduced from 1960. Arrol employed 1,820 in 1950, but by 1972 had ceased to exist.

## 4. Summary of findings

The cost systems studied, as summarised in Table 2, had a number of common characteristics: the calculation of estimates in advance being almost universal and necessary for pricing of the individualised work undertaken.

The two main exceptions were in motor vehicles and iron and steel, where Albion and Colvilles made more or less standardised products which were engineered and reduced to specifications in advance of costing. In many of these industries, 'oncost' was usually added in estimates and to costs using a labour-based absorption technique, although in Fairfield's shipyard (which is not examined in detail here), sales was used instead. In most firms, where jobs were large enough, comparisons were made between actual costs and estimates, information being collected and updated progressively. The smaller firms, with smaller jobs, dispensed on the whole with the monitoring of actual costs, contenting themselves with an annual profit and loss account and detailed knowledge of each job. In these firms senior management was in any case closely involved in day to day operations.

As will be seen, standard costing was not introduced in the steel, shipbuilding, locomotive manufacture, vehicle production, general engineering and bridge building firms concerned at any time during the period studied. The more restricted records of the sugar and coal-cutting machinery firms studied only survive to the early 1930s and these are based on actual rather than standard costs. For reasons which will be given below, it appears unlikely standard costs would be developed at these firms, but this is a matter for speculation. In the pumps and boilers businesses studied, standard costs were adopted at some time (not now known) for a small minority of low value standard items, but not for mainstream contract work. In short, standard costing made little impact in the sector during the period studied.

So far as budgetary control is concerned, the findings have to be treated with more care. While budgetary control may represent a logical extension of standard costing, the terms 'budget' and 'budgetary control' can be used to refer to any form of financial forecasting (Boyns, 1998a: 262). At Albion, for example, the 'budgets' introduced in 1958 were merely quarterly forecasts of financial profit for the forthcoming financial year, and what was installed at North British Locomotive in 1960 was of a similar character. The only example found of a budgetary control system linked to full standard costing was that of Colvilles, introduced outside the period of study, and after the firm had been nationalised. The lack of evidence of other instances of budgets and budgetary control does not, however, rule out the possibility that they may have existed and that records have just not survived. It can be stated with certainty, though, that since standard costing appears to have made little impact in the sector, integrated systems which combined standard costs, budgets and budgetary control could not, self evidently, be developed on any scale.

## 5. Cost accounting development within the sector

The one obvious factor which explains the poor uptake of standard costing and its extrapolation into budgetary control is the lack of enthusiasm within the sector for 'Scientific Management'. Posterity is indebted to Sam Mavor of Mavor and Coulson for leaving several papers which go some way to explaining why this was the case, and these will be examined later. Before this is undertaken, 'Scientific Management' requires to be defined. According to its founder, F.W. Taylor, it depended on four underlying principles:

> First. The Development of a true science. Second. The scientific selection of the workman. Third. His scientific education and development. Fourth. Intimate friendly co-operation between the management and the men (Taylor, 1947: 130).

The 'mechanism' of the system would typically consist of time study, functional or divided foremanship, together with the standardisation of all

**Table 2**
**Features of Cost Systems**

| | | **Overhead rates** | | | | | |
|---|---|---|---|---|---|---|---|
| *Company* | *Costs prepared by* | *Single* | *Multiple* | *Basis* | *Actual v estimate prepared (y/n)* | *Budgetary control (y/n)* | *Standard costing (y/n)* |
| John Brown | Estimators | ✓ | | Direct labour | y | n | n |
| North British Locomotive | Estimators | ✓ | | Direct labour | y | From 1960 | n |
| Albion Motors | Cost Office | ✓ | | Direct labour | n | From 1958 | n |
| Colvilles | Cost Office | | ✓ | Direct labour | n | From 1970s | From 1970s |
| Babcock & Wilcox | Estimators | | ✓ | Not known | y | n | n |
| J & G Weir | Estimators | | | Not known | y | n | n |
| Mirrlees Watson | Estimators | ✓ | | Not known | y | Not known | n |
| Wm Baird & Sons | Estimators | | ✓ | Not known | n | n | n |
| Fullarton Hodgart & Barclay | Estimators | | ✓ | Direct labour | y | n | n |
| Mavor & Coulson | Estimators | ✓ | | Direct labour | y | n | n |
| Sir William Arrol | Estimators | | ✓ | Various | y | From 1960 | n |

tools and implements and of the acts or movements of workmen for each class of work. In addition, the desirability of a planning room or department, the use of the 'exception principle', the use of slide rules and similar time-saving implements, instruction cards, the use of large bonuses for the successful performance of the task, the 'differential rate', mnemonic systems for classifying products and implements, a routing system and a 'modern cost system' were also cited by Taylor as 'elements'.

In the last analysis, 'Scientific Management' had a financial focus. The final test of any system, according to Taylor was 'does it pay?' (Taylor, 1947: 64). It was concerned with the division of the 'surplus' between workers and proprietors (Taylor, 1947: 30). Logically, it soon extended its initial emphasis on labour time standards and efficiency to standard costing and later, budgetary control (Fleischman, 1999).

Given that the core disciplines of Scientific Management were work study and method study, it followed that if these were not introduced in a firm, they could not be extended into standard costs and budgets. In only one case among the firms studied was Taylorism adopted, as was indicated above, the firm concerned, Mavor and Coulson, did not extrapolate this into standard costing and budgetary control, proof of the fact that the one did not guarantee the other. Indeed, by the early 1930s, in spite of the introduction of standard times, it was still obliged to run parallel bonus systems, one based on the 'scientifically' measured standard labour times and the other on older times fixed by rate fixers, no doubt to avoid industrial disputes.

Why the reluctance to espouse 'Scientific Management' and its associated accounting techniques? In 1930, 1931 and 1932, Sam Mavor, Chairman of Mavor and Coulson, gave three important papers to the Institution of Engineers and Shipbuilders in Scotland which shed light on this question (Mavor, 1930; 1931; 1932). The Institution had in its membership the leading figures in most of the major shipbuilidng, engineering and metals business of the West of Scotland, and was affiliated to the UK-wide Institution of Mechanical Engineers. It met approximately monthly, and at each session, several papers were presented, almost wholly on engineering topics. In his 1930 paper, in contrast, Mavor spoke on 'Payment by Results and Rate Fixing' following this in the next year with a paper on 'Time Study in Engineering' and in 1932 with one entitled 'The M. & C. System of Time Study and Rate Fixing'.

According to Mavor, Scientific Management was 'at first not well received...not considered practicable and...not taken seriously' in the West of Scotland (Mavor, 1930). The major reason was that 'although well suited to some industries, it can only be applied within narrow limits to general engineering' (Mavor, 1931). As he had noted in his 1930 paper, there were only 'a few examples of mass or multiple production, and not many of repetition work' in the West of Scotland (Mavor, 1930). As McKinlay and Zeitlin have recently said of post-World War One, British engineering employers generally,

> 'Worried by the inefficiency and inflexibility of mass production, engineering employers overwhelmingly rejected Taylorism as appropriate for the high-quality, small batch production which again dominated British engineering after the Armistice' (McKinlay and Zeitlin, 1989: 39).

Its unpopularity is confirmed by the fact that in 1924, an 'expert adviser' appointed by the Clyde Engineering Trades Association to popularise Taylorist ideas resigned after a year, completely disheartened by his lack of success (McKinlay and Zeitlin, 1989:43). It is regrettable that fuller details of the reasons for the rejection of Taylorism and Scientific Management within the sector have not yet come to light, for it was in the metals and engineering industries that it first made its impact in the US. The facts which follow confirm, however, that measurement-based pay systems generally were seen as impracticable by many firms in the 'Workshop of the Empire'.

Survey evidence collected by Mavor for his 1930 paper reveals that 56% of respondent engineering firms in the district (accounting for 30,000 journeymen) paid their work force on plain time. They had rejected payment by results systems. Out of the 46 firms in this category, 33 cited 'variety of work', 'work chiefly repairs' or 'cannot be applied to whole shop' as the reason for not having measurement-based payment systems.

The industrial relations situation may also have played a part in their thinking. Nine firms cited 'trouble with men anticipated' or 'men hold back for high rates' as a reason. The industrial West of Scotland was also known as 'Red Clydeside' and had been a hotbed of socialist-inspired industrial unrest since World War One. In times of recession, from about 1921 to 1935, management was in the ascendant in industrial relations, but it is clear from the foregoing that there were even then problems with a change to measurement-based pay. From 1935 onwards, rearmament brought skill shortages and the return of trade union power to the West, bringing demands for detailed union involvement in measurement-based payment systems and for the 'closed shop'. At Albion, for example, shop stewards became involved in the setting of individual piecework times (Shop Stewards Minutes, Biggar). This made the progress of Taylorism, Scientific Management and its accounting extensions even more unlikely. During and after World War Two, a similar situation prevailed.

This presents something of a paradox: that the businesses studied in general rejected Taylorism, standard costing and budgetary control, notwithstanding the fact that these techniques were substantially the invention of engineers, and should, it might be argued, have appealed to the engineers who ran most of the industries examined. It cannot be denied that an engineering culture prevailed among them, visible in the activities of the Institution of Engineers and Shipbuilders and in the engineering bias of boards (McKinstry, 1999). The practical problems with Taylorism, standard costing and budgetary control outlined above, may well have overwhelmed any innate loyalties to fellow engineers. But it is also probable that, unlike Sam Mavor, a number were uncomfortable with financial techniques of even the most basic kind, notwithstanding the engineering origins of the newer and more sophisticated costing practices. This was certainly the case at Albion (McKinstry, 1999) and at Beardmore, the huge Glasgow-based armaments and engineering combine. As Hume and Moss (1979: 1-10) point out, William Beardmore, the firm's chairman, was far more interested in the spectacular engineering processes and products in which his firm specialised than in financial figures.

It is appropriate, in conclusion, to attempt some generalisations concerning the factors driving cost systems within the sector over the period. Was it the contractual nature of much of the work, the industrial relations climate or the management culture which caused these to be originated and, for the most part, perpetuated over the period? Job and contract costing had a long genesis stretching back at least as far as the early years of the 19th century (see, for example, McLean, 1995). The engineering culture among management seems to have crystallised from the latter half of the 19th century, as witnessed by the growth of the Institution of Engineers and Shipbuilders of Scotland from 1858 and the pioneering of BSc degrees in Scottish universities from the 1860s and 1870s. The escalation of trade union militancy on Clydeside and in the UK at large is generally associated with World War One. Prior to this, in 1913, British trade union membership had stood at 3.9m, whereas by 1918 it had risen to over 8m as a response to worsening wages and shortages of consumer goods. Bearing the above chronology in mind, it appears that the contractual nature of the work governed the shape of most costing systems, that these fitted the engineering predilections of senior management, and when industrial relations deteriorated, there was an extra incentive not to effect change as alternative costing approaches became available.

## 6. Evaluation of the systems utilised

An attempt to evaluate the systems in force was promised at the outset. To do this requires a definition of a good costing system. If cost accounting can be characterised as the collection and presentation of cost-based financial information as an aid to managerial decision-making and control, then a good system should arguably be able to present information that is timely. In general, costing information should be produced as early as possible, and it is desirable that cost overruns be anticipated rather than merely reported after the event, to enable preventative action to be taken.

A good system should also present *relevant* cost information. This involves the concept that the costs and thus the profitability of the most economically significant units of production be reported, rather than grand totals for each category of cost, or the costs of economically insignificant units. The term 'relevant' may also be taken to imply that where material, labour and overhead are substantial elements of cost relative either to products or in total, that due attention is paid to each element. A good cost system should also produce *cost effective* information, in the sense that it yields benefits perceived to be of a greater value than the costs involved in producing it.

The extent to which any system may be reckoned to fit these three criteria is, of course, a matter of judgment, and is more difficult if, as in the present study, not all the facts are known. An attempt will however be made.

First, did the cost systems examined produce *timely* information? At a basic level, it appears to have been produced as fast as the armies of estimators and clerks employed would allow, and there is evidence that the larger firms, at least, invested in accounting machines and modern shop floor clocking systems whenever these became available. In terms of providing '*ex ante*' cost information, this was taken care of through the systems of estimates which operated in 'nearly all' engineering works in the area (Mavor, 1932: 58). An estimate was built up for tendering purposes, based on material, labour and overhead costs, plus profit margin. This could be used as a budget for each job or contract at prime cost level and in all but the smallest firms examined above, was compared progressively and sometimes also on a final forecast basis with estimate, resulting in the timely identification of past losses and sometimes the anticipation of future ones. Moreover, additional controls for material and labour costs existed as ancillaries to comparisons with estimate. The larger materials purchases were put out to competitive tender before commitment, and the estimates themselves were based on tenders.[9] The various bonus systems in operation gave quantitative controls on labour, and where these did not operate, supervision had direct control.

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[9] John Brown's cost books reveal a fairly consistent pattern

In terms of the *relevance* of the information produced, nothing could have been more relevant or necessary than tracking the progress of jobs and contracts, which constituted the unit of production for most of the firms. This allowed pricing errors or undercosts to be identified and lessons to be learned for the future. In some businesses, such as John Brown's, the total trading position was struck by adding all contracts together, thus making possible a forecast of profit for the accounting year. There is no evidence this was carried out elsewhere, but it seems more than likely.

The one area of obvious weakness, in terms of the relevance of the costing information produced, appears to have been in the lack of departmental analysis of expense, which often accounted for two or three times direct labour cost. This was only introduced at North British Locomotive c1960, and was not done in John Brown's, Albion, Colvilles or Babock's during the period. The lack of records makes it impossible to establish the position elsewhere. The situation was certainly monitored carefully in total in these firms at board meetings, and the implications of low throughput for fixed overheads were widely understood, specially relevant to the period between the wars. A typical response to lack of demand was to shed indirect as well as direct labour, and at John Brown and elsewhere, systems of stores requisitions controlled some non-labour expenses at the level of the employee. There therefore existed non-financial controls in the area of overheads which, to some extent, made up for a lack of costing reports covering departmental expense.

There is no reason to doubt the cost-effectiveness of the information produced. This can never be quantified, only judged; but in general it appears that the information was well used by boards and management staff. Taken together with the conclusion that it was as timely as the technology allowed and was, subject to the exceptions outlined, relevant, the expense appears likely to have been considered worthwhile.

In contrast, cost accounting systems incorporating standard costing and budgetary control, through the setting of standards and the reporting and analysis of variances, would arguably have given management information of a more precise kind. The costs of such systems would not have been restricted to accounting expense, however. The approaches of Taylor and his followers involved a thoroughgoing and radical review of all work processes, methods and layouts and the acquisition of the most efficient machinery. In other words, heavy initial investment was required across the business, including the accounting department, repayable over a period of years.

As noted above, Taylor himself asked the question 'does it pay?' of any system. Quite clearly, the industrialists of the West of Scotland concluded that costing systems based on Scientific Management would not. It seems likely that the long economic slumps between the wars, with their 'knock on' effects through all parts of the sector, played their part in the reasoning process. Quite apart from the other practical difficulties mentioned above, investments of this kind appear to have carried too high a risk for the sector studied at this time.

## 7. Conclusion

When J. & P. Coats, the giant West of Scotland-based multinational thread producers, began to introduce standard costs in 1932, it was recorded, somewhat unsurprisingly in the above context, that the 'progress made...[was] subject to considerable delay caused by the absence of persons capable of giving technical advice' (Minutes, UGD 199/1/1/24). Some of the reasons for this dearth of local experience will by now be obvious. This small incident does, though, suggest a further question: if Glasgow had been richer in consultants, would standard costing and its sister techniques have been more widespread there? As Kipping (1997) points out, Britain at this time was both disinclined to use management consultants extensively and in general rather sceptical of Taylorism. It seems unlikely that the canny engineers of the West of Scotland would have been interested, although this must remain a matter for speculation.

Future research will, however, be required in order to establish whether or not the pattern of cost accounting outlined above was typical of all the industries of the West of Scotland, only of its engineering, shipbuilding and metals sector, or indeed, whether it was replicated elsewhere. It may yet be possible that further engineering-related archives for this period will emerge in the West of Scotland and show that, notwithstanding the conclusions reached above, there were exceptions to the rule within the region examined.[10]

Finally, this study has broad implications for future research into the history of cost accounting in Britain. Previous studies have identified a complex pattern of adoption of standard costing and budgetary control across the UK, about which all too little is as yet known (Boyns, 1998a: 290-291; Boyns, 1998b: 18). The account given above has,

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of underspend against estimates for both material and labour throughout the period.

[10] It is hoped that some cost accounting records of Singers, Clydebank, may yet emerge. It is however, known that work study was only introduced there in the period 1948–50, and departmental expense analysis c1960 (Duncan, 1999).

**Appendix 1**

**Primary Sources**

| *Firm* | *Location of Records* | *Types of Records* |
|---|---|---|
| John Brown | Glasgow University Business Archives (GUBA) | Cost books, cost v estimate books, wages analysis books, chart of accounts and instructions, board minutes, board papers |
| North British Locomotive | GUBA | Cost and weight books, contract books, published accounts, financial statements, correspondence. |
| Albion Motors | Biggar Museum Trust | Board minutes, financial accounts, shop stewards minutes |
| Colvilles | Scottish Record Office, Edinburgh | Trading and cost reports |
| Babcock & Wilcox | GUBA | Board minutes, output records, cost records |
| J & G Weir | GUBA | Correspondence, accounting records, manuscript history |
| Mirrlees Watson | GUBA | Job books, quotation books |
| Wm Baird & Son | GUBA | Minutes of agreement, cost and estimate books |
| Fullarton, Hodgart & Barclay | GUBA | Cost books, general records |
| Mavor and Coulson | Ballast Trust, Johnstone | Personal papers, apprentice magazines |
| Sir William Arrol | Strathclyde Regional Archives, Glasgow | Cost abstracts, estimate books, cost books, tenders |

however, filled in some gaps and drawn attention to two important factors which appear likely to apply beyond the types of industry studied here: the industrial relations climate, which has already been highlighted by Walker and Mitchell (1998) and an 'engineering culture' amongst management (McKinstry, 1999).

Both have a peculiarly British ring and could well feature large in the explanations of British costing development that emerge in the future.

## References

Boyns, T. (1993). 'Cost accounting in the South Wales coal industry c1870-1913'. *Accounting, Business and Financial History*, 3(3): 327–352.

Boyns, T. (1998a). 'Budgets and budgetary control in British business to c1945'. *Accounting Business and Financial History*, 8(3): 261–301.

Boyns, T. (1998b). 'The development of costing in Britain'. Paper presented at the 4th Management and Accounting History Conference, Poitiers.

Boyns, T. and Edwards, J. R. (1997). 'The construction of cost accounting systems in Britain to 1990: the case of the coal, iron and steel industries'. *Business History*, 39(3): 1–29.

Campbell, R. H. (1978). 'The North British Locomotive Company between the Wars'. *Business History*, 2: 201–233.

Duncan, J. B. (1999). *Singer and the Clydebank Factory Legend*. Unpublished personal memoir kept at Paisley University Library.

Epstein, M. J. (1978). *The Effect of Scientific Management on the Development of the Standard Cost System*. New York: Arno Press

Fleischman, R. K. (1999). 'Completing the triangle: Taylorism and the paradigms'. *Accounting, Auditing and Accountability Journal*. Forthcoming.

Fleischman, R. K. and Tyson, T. N. (1993). 'Cost accounting during the Industrial Revolution: the present state of historical knowledge'. *Economic History Review*, XLVI(3): 503–517.

Fleischman, R. K. and Tyson, T. N. (1998). 'The evolution of standard costing in the UK and US: from decision making to control'. *Abacus*, 34(1): 92–118.

Fleming, A. I., McKinstry, S. and Wallace K. (1999). *The Decline and Fall of the North British Locomotive Company, 1940-1962: Technological and Financial Mismanagement or Institutional Failure?* Unpublished manuscript, Department of Accounting, Economics and Languages, University of Paisley.

Hume, J. and Moss, M. (1977). *Workshop of the Empire, Engineering and Shipbuilding in the West of Scotland*. London: Heinemann, p34.

Hume, J. and Moss. M. (1979). *Beardmore: the History of a Scottish Industrial Giant*. London: Heinemann.

Kipping, M. (1997). 'Consultancies, institutions and the diffusion of Taylorism in Britain, Germany and France, 1920s to 1950s'. *Business History*, 39(4): 67–83.

Locke, R. R. (1979). 'Cost accounting: an institutional yardstick for measuring British entrepreneurial performance, circa 1914'. *The Accounting Historian's Journal*, Fall, 1–22.

Locke, R. R. (1984). *The End of the Practical Man*. Greenwich, Connecticut: JAI Press.

Loft, A. (1986). 'Towards a critical understanding of accounting: the case of cost accounting in the UK, 1914-25'. *Accounting, Organisations and Society*, 11(2):137–169.

Loft, A. (1990). *Coming into the Light: A study of the Development of a Professional Association for Cost Accountants in Britain in the Wake of the First World War*. London: Chartered Institute of Management Accountants.

McKinlay, A. and Zeitlin, J. (1989). 'The meanings of managerial prerogative: industrial relations and the organisation of work in Britain, 1880-1939'. *Business History*, XXXI(2): 32–47.

McKinstry, S. (1991). 'The Albion Motor Company: growth and specialisation 1899-1918'. *Scottish Economic and Social History*, XI: 36–51.

McKinstry, S. (1999). 'Engineering culture and accounting development at Albion Motors, 1900-c1970'. *Accounting Business and Financial History*, 9(2): 203–223.

McLean, T. (1995). 'Contract accounting and costing in the Sunderland shipbuilding industry, 1818-1917'. *Accounting, Business and Financial History*, 5(1): 110, 116.

Payne, P. (1979). *Colvilles and the Scottish Steel Industry*, Oxford: Clarendon Press: pp. 1–14, 143, 159–162, 240–241, 335–360, 405.

Payne, P. (1992). *Growth and Contraction: Scottish Industry c. 1860–1990*. The Economic and Social History Society of Scotland: pp. 23, 24, 39, 40.

Peebles, H. B. (1987). *Warship Building on the Clyde: Naval Orders and the Prosperity of the Clyde Shipbuilding Industry, 1889-1939*. Edinburgh: John Donald.

Quail, J. M. (1997). 'More peculiarities of the British: budgetary control in UK and US Business to 1939'. *Business and Economic History*, 26(2)(Winter): 617–631.

Reader, W. J. (1971). *The Weir Group, a Centenary History*. London: Weidenfeld & Nicolson: pp. 1–17, 137, Appendix 1.

Saul, S. B. (1962). 'The motor industry in Britain to 1914'. *Business History*, V: 23: 44.

Slaven, A. (1980). *Growth and Stagnation in British/Scottish Shipbuilding, 1913-1977*, in Kuuse and Slaven, *Scottish and Scandinavian Shipbuilding*. (N.P.).

Sowell, E. M. (1973). *The Evolution of the Theories and Techniques of Standard Costs* Alabama: University Press.

Taylor, F. W. (1947). *Scientific Management*. New York: Harper & Row.

Walker, S. P. and Mitchell, F. (1988). 'Labour and costing: the employees' dilemma'. *Accounting Historians Journal*, 25(2): 35–62.

## Primary sources

Albion Shop Stewards Minutes, 1939-42, Albion Archives, Biggar.

Census, 1931.

Census, 1951.

Glasgow University Business Archives, Records of John Brown, UCS 1/80/6—Hull cost book no. 16.

Records of John Brown, UCS 1/85/27—Cost book.

Records of John Brown, UCS 1/79/6—Boiler cost book no. 20.

Records of John Brown, UCS 1/78/3—Engine cost book no. 18.

Records of John Brown, UCS 1/7/272—Manager's progressive cost book.

Records of John Brown, UCS 1/86/138—Comparison of cost and estimate book.

Records of John Brown, UCS 1/75/11—Contract costs.

Records of John Brown, UCS 1/54/101-1051—Wages analysis.

Records of John Brown, UCS 1/8/47—Instructions to Officials relating to system of Costs.

Records of John Brown, UCS 1/1/1—Board Minutes from 1910-1924.

Records of John Brown, UCS 1/2/1-2—Board papers from 1930-1931 and 1961-1962.

Records of the North British Locomotive Company Ltd, UGD 11/5/2/1—Costs and Weight Books.

Records of the North British Locomotive Company Ltd, UGD 11/0/1-2—Contract Books

Records of North British Locomotive Company Ltd, UGD109/2/8-27—Published Balance Sheets and Profit and Loss Accounts from 1903 to 1930.

Records of the North British Locomotive Company Ltd, UGD 11/14/1—Financial Statements, Jan-Feb 1960.

Records of Babcock & Wilcox, UGD 309/1/11/4—Minute Book.

Records of Babcock & Wilcox, UGD 309/3/16/3—Works Output and Tonnage Records.

Records of Babcock & Wilcox, UGD 309/1/11/1—Cost Records.

Records of Babcock & Wilcox, UGD 309/1/7/1—Minutes of Executive & Finance Committee.

Records of Mirrlees Watson, UGD 62/2/1—Order Book.

Records of Mirrlees Watson, UGD 62/3/1—Quotations Book 1919-1920.

Records of William Baird & Sons Ltd, UGD 138/6/1—Minute of agreement between William Baird's Trustees and William Baird and Sons Ltd, 1909.

Records of William Baird & Sons Ltd, UGD 138/7/1—Cost and Estimate Book.

Records of Fullarton, Hodgart & Barclay, UGD 120/3/4.

Records of Fullarton, Hodgart & Barclay, UGD 120/3/34—Oncost Book.

Records of J. & P. Coats Ltd, UGD 199/1/1/24—Minute Books.

Mavor S., '*Payment by Results and Rate Fixing*'. Bound Excerpt from the Transactions of The Institute of Engineers and Shipbuilding in Scotland (1930), (formerly the property of S. Mavor), kept at the Ballast Trust, Johnstone.

Mavor S., '*Time Study in Engineering*'. Bound Excerpt from the Transactions of The Institute of Engineers and Shipbuilding in Scotland (1931), (formerly the property of S. Mavor), kept at the Ballast Trust, Johnstone.

Mavor S., '*The M & C System of Time Study and Rate Fixing*'. Bound Excerpt from the Transactions of The Institution of Engineers and Shipbuilding in Scotland (1932), (formerly the property of S. Mavor), kept at the Ballast Trust, Johnstone.

Mavor & Coulson Apprentice's Magazine 1932: pp57-58 and 1929: pp105-109 (Ballast Trust, Johnstone).

Scottish Record Office, Edinburgh, Colvilles Trading and Cost Reports GD 464/3847 and 38/16/15.

Strathclyde Regional Archives, Records of Fairfield's, UCS 2/30/1—Fairfield's Accounting System.

Records of Sir William Arrol, TD 208/19/1—Cost Abstract Book 1934-1935.

TD 208/73/1—Estimate and Cost Book 1901-1912.

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# Accounting for goodwill: an examination of factors influencing management preferences

Pelham Gore, Fauziah M. Taib and Paul A. Taylor*

**Abstract**—This paper investigates factors that influenced the position of managements of UK-listed companies in the heated debate that surrounded proposals for a new standard on goodwill accounting, i.e. the factors influencing whether managements preferred immediate write-off or capitalisation-based approaches. The factors investigated are derived from contracting cost theory, and include those associated with debt covenant restrictions and profit-based management schemes. They also include non-agency contracting costs. A key feature of the design is that, compared to prior research, we specify more rigorously circumstances where such contracting cost effects are, or are not, likely to be binding. In addition, the paper investigates the effects on management preferences of their beliefs about revisions in market perceptions of their companies resulting from changes in goodwill accounting. Our results support certain contracting cost-based hypotheses, but they also indicate that management beliefs about changes in market perceptions of their companies constitute a strong influence on their preferences.

## 1. Introduction

This paper reports the results of an investigation of factors that influenced the positions taken by managements of UK-listed companies during the heated debate surrounding proposals for a new standard on goodwill accounting. This was at a time when the UK Accounting Standards Board (ASB) had not decided upon an appropriate method and was canvassing various constituencies, including managements, on how it should proceed. One set of factors examined here to explain why managements favoured the mandating by the ASB of capitalisation or immediate write-off based approaches is based on contracting cost theory. This includes agency costs associated with debt covenants and management compensation schemes and other, non-agency, costs. Also examined are information effects deriving from managements' beliefs about the impact goodwill accounting would have on market perceptions of their companies.

Our paper adds to prior UK work on this issue by gathering information that is not publicly available about the nature of the bond covenants and management compensation schemes of large UK listed companies. Our results indicate that certain contracting cost factors, such as binding gearing-based debt covenant restrictions and applicable profit-based management compensation plans, do affect management preferences. They also show that such preferences are strongly affected by management beliefs about market perceptions. Our identification of such factors can assist policymakers in understanding what may influence management positions during future debates over other reporting standards.

The next section of the paper examines the development of goodwill accounting in the UK. Related studies are then reviewed and hypotheses developed. After describing the data and the variables used to operationalise hypothesis testing, we explain the model used. Our results and related sensitivity analyses are then discussed. Finally, a summary and conclusions are presented and implications for standard-setters discussed.

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## 2. The UK debate on goodwill

Accounting for goodwill has long been controversial in the UK. There is evidence that, in the absence of regulation, preparers have been divided over which approach to use. The *Survey of Published Accounts 1979* (Skerratt, 1980:158) shows that in 1976/77 38% of companies disclosing a goodwill accounting policy carried goodwill at original cost, 42% used immediate write-off to reserves and 20% capitalised and amortised it. Subsequently, the Companies Act 1981 prohibited the first of these methods. The Accounting Standards Committee's (ASC) SSAP 22 *Accounting for Goodwill* (ASC, 1984) was unusual in allowing alternative treatments: it stated that goodwill should normally be dealt with by immediate write-off direct to reserves but also permitted capitalisation and amortisation. However, the vast majority of UK companies chose immediate write-off, with the result that their reported profit figures were not adversely affected by amortisation of purchased goodwill, but their gearing (leverage) ratios were severely increased due to depletion of accounting equity. Weetman and Gray (1991) found that, for a sample of 41 UK companies in 1986, profits under UK GAAP were 10.2% higher than under US GAAP because of such goodwill accounting differences.

The often dramatic balance sheet effects of immediate write-off elicited considerable attention. Fierce debate arose over the capitalisation of intangibles such as brand names so as to ameliorate such adverse gearing effects (Barwise et al, 1989), and the possible concomitant incentives to revalue (upwards) fixed assets were also examined (Lin and Peasnell, forthcoming). Considerable argument was also generated over how goodwill itself should be accounted for (see, for example, Arnold et al; 1992). In particular, concerns were aired that the SSAP 22 position was at variance with the international norm of capitalisation and amortisation. Arguments were advanced for capitalisation, predicated, for example, on the desirability of international harmonisation and concerns that immediate write-off against reserves might give British companies an advantage in making international take-over bids (Choi and Lee, 1991; ASB, 1997). The fact that UK managements had discretion in choosing their companies' goodwill accounting treatment was also a cause for great concern.

Proposals by the ASC (Exposure Drafts 47 and 52: ASC, 1990a, 1990b) to impose capitalisation and amortisation of goodwill and other intangibles met with overwhelming opposition: 93% of corporate submissions and 73% of all submissions were against the goodwill proposals (ASB, 1993:12). In December 1993, the ASB, admitting it could not achieve agreement among its board members on this topic, issued a Discussion Paper (DP) *Goodwill and Other Intangibles* (ASB, 1993), outlining six alternatives for accounting for goodwill, three involving capitalisation and amortisation, and three immediate write-off.[1] The DP indicated that the ASB wished to adopt a single approach to goodwill accounting.

As as result of responses to the DP, the ASB issued a Working Paper (WP), *Goodwill and Intangible Assets* (ASB, 1995). This generally supported capitalisation and predetermined life amortisation, with impairment tests for goodwill or intangibles 'believed to have indefinitely long lives'. The ASB made a 'tentative conclusion' that goodwill should be shown as an asset, but still allowed the possibility that it would be shown as a separately disclosed deduction from reserves. After public hearings in September 1995, the ASB issued FRED 12 in June 1996 and the FRS 10 in December 1997 (ASB, 1996, 1997). Both required capitalisation of goodwill and other intangibles, with amortisation over their useful economic lives where these are regarded as of limited duration. These documents, like the WP, included a rebuttable presumption that such lives will not exceed 20 years. However, where goodwill or intangibles are regarded as having an indefinite life and are capable of continued measurement, they are not to be amortised, but are to be written down only if necessary, using annual impairment tests as a way of recognising the loss of value.

This paper focuses specifically on the goodwill accounting aspects of the debate and, in particular, on the period between the ASB's 1993 Discussion Paper and its 1995 Working Paper proposals, a time of uncertainty over which course of action the ASB would take. The inclusion by the ASB in the DP of both immediate write-off and capitalisation options provides the opportunity to study the preferences of UK-listed companies for the accounting treatment to be adopted in the future standard and also the factors that were driving their preferences.

## 3. Development of hypotheses

Studies examining the factors influencing accounting choice have been difficult to carry out in the UK due to limitations on data availability. Our work builds on earlier UK studies that examined contracting and other explanations for accounting choice decisions. Mather and Peasnell (1991), for example, studied the decision in 1988 by major

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[1] The six alternatives were:
i. capitalisation with predetermined life amortisation.
ii. capitalisation subject only to impairment tests.
iii. a combination of capitalisation approaches i and ii.
iv. immediate write-off direct to unspecified reserves.
v. immediate write-off to a separate reserve.
vi. combination of immediate write-off to reserves with impairment tests.

British companies to capitalise brands. They found that capitalisation was associated with high leverage and the implications of Stock Exchange Class 1 transactions (discussed later). Grinyer et al. (1991) examined factors that influenced the proportion of a company's purchase price assigned to net tangible assets and therefore to goodwill. They found that a contracting cost-related variable, the post-acquisition gearing ratio, influenced this decision. However, such British studies have been hampered by the lack of publicly available information about many of the variables widely assumed to drive accounting choices, e.g. company debt covenant restrictions and profit-based management compensation plans. To overcome this problem we collect data by survey and use them in conjunction with published financial data.

Other UK studies have examined the form of restrictions in UK debt covenants, relevant here in our measurement of contracting cost variables. Citron (1992a) examined 25 UK bank loan contracts and found that the great majority were based on rolling (extant) GAAP, and all were based on consolidated amounts. Non-GAAP approaches were adopted in net worth covenant restrictions relating to some intangibles and to goodwill, but apparently not in the gearing- or profit-based restrictions that we use in our study. Earlier, Citron (1992b) had found by survey that bankers claimed they would be understanding in dealing with technical breaches caused by changes in GAAP, and that costs imposed on borrowers resulting from such breaches are therefore likely to be smaller than for other breaches.

Citron (1995) found in 108 UK public debt issues (over an earlier period than our study) that, unlike US public debt agreements, UK accounting-based covenants are mainly affirmative, i.e. applying at all times while the debt is outstanding. He conjectured (p. 148) that such covenants potentially influence managements' accounting policy choices more than where covenants only become operational at the time of specified actions such as raising new debt. Day and Taylor, in similarly orientated research, interviewed 18 officials from financial institutions (Day and Taylor, 1995), 44 corporate treasurers from major UK companies (Day and Taylor, 1996) and examined a sample of loan agreements. They reported (Day and Taylor, 1994) that gearing and interest cover, used in our paper, were two of the main accounting variables used in bank loan covenants in the UK. Studies, summarised in Leuz et al. (1998), found that dividend based covenants were not widely used in the UK.[2]

We now set out the hypotheses to be tested.

### 3.1. *Contracting cost hypotheses*

We use costly contracting theory to identify factors, which include both agency and non-agency costs, expected to underlie management preferences for particular accounting treatments of goodwill (Watts and Zimmerman, 1990: 134-5).

#### 3.1.1. *Agency contracting costs*

The paper focuses on three primary agency relationships discussed in the literature, between 1) management and shareholders, 2) shareholders/managers and debtholders, and 3) the company and outside regulators ('political costs'), and frames hypotheses in terms of the standard variables used to measure 'opportunistic' management behaviour (Watts and Zimmerman, 1990: 138-140).

Based on such a framework, we would predict company preferences for goodwill accounting to take the following forms:

- Where there are management compensation schemes based on accounting profits[3], influenced by the effects of goodwill accounting, there will be a preference for methods not impacting adversely on reported profit, i.e. immediate write-off to reserves methods. We therefore predict a negative association between capitalisation-based approaches and the existence of such compensation plans.
- Where a company has debt covenant restrictions based on balance sheet ratios such as gearing, we hypothesise a positive association between capitalisation-based preferences and the presence of such restrictions. However, if debt covenant re-

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[2] Other non-accounting policy choice research on goodwill, based on US data, has focussed on the relationship between the amount of reported goodwill in that country and the market capitalisation of equity. For example, Chauvin and Hirschey (1994), using a simultaneous equations approach, examined interrelationships between goodwill, net income and market capitalisation. McCarthy and Schneider (1995) also examined the relationship between equity market capitalisation and goodwill, including income-based explanatory variables within an Ohlson-type framework (Ohlson, 1995). They concluded that, for US firms, the market does seem to treat acounting goodwill as a value component. Jennings et al. (1996) report a strong cross-sectional association between equity values and recorded goodwill balances for US firms, but only a weak negative relationship between goodwill amortisation and equity values. Barth and Clinch (1996) examine the effects of international accounting differences and their effects on share prices. Their US findings are consistent with the above studies and they find that for UK companies share prices seem to act as if goodwill were an asset, but with a lower coefficient than other assets.

[3] In our questionnaire we asked about the existence of *accounting profit*-based management compensation plans and *accounting*-based debt covenant restrictions, in the full knowlege that such contracts also contain a wide range of other non-accounting indicators (e.g. see Smith and Warner, 1979 and Citron, 1992b and 1995). We make the assumption that other contracting provisions do not mask such first order effects in our study. We also specifically adduced information about the treatment of goodwill in such contracts. Unfortunately, as in many other studies, we are not able to examine the upper and lower bounds of management compensation contracts discussed by Healy (1985).

strictions are based on income statement-based ratios, companies will prefer methods that do not reduce profits, i.e., immediate write-off to reserves methods. Thus we hypothesise a negative association between capitalisation-based preferences and the presence of interest cover-based restrictions.

- In politicially visible companies, we use size to proxy for political costs (Watts and Zimmerman, 1990: 139) and hypothesise that capitalisation-based approaches would be preferred by large companies since they reduce reported profit compared to immediate write-off ones (i.e., a positive association between capitalisation-based approaches and size). Size variables are ambiguous to interpret, and can be characterised as control variables. We also employ a dummy variable in our models to assess effects unique to utilities, which are more heavily regulated; however, as regulation is complex, we do not predict the direction of this relationship.

We predict that company preferences would only be affected where such accounting-based management compensation contracts and debt covenant restrictions are near contract limits ('binding') and based on accounting numbers calculated using rolling GAAP; no effect is predicted if they are based on UK GAAP 'fixed' at the time the agreement was signed.

### 3.1.2. *Non-agency contracting costs*

These take many forms, for example transaction costs (e.g. brokerage costs), renegotiation costs and other differential costs. We examine two potentially differential costs incurred by UK-incorporated listed companies: whether companies have a US quote and whether they have had to consider a (UK) Stock Exchange Class 1 transaction. Since US GAAP requires capitalisation and amortisation, companies having a US quote already have to produce accounts on this basis (or a reconciliation between US GAAP and their accounts produced under UK GAAP) regardless of the method that they choose for UK reporting purposes. If the ASB required capitalisation, such companies would incur fewer extra compliance costs than companies not quoted in the US. We would thus predict a positive association between preference for capitalisation-based approaches and having a US quote.

Listed companies incur transaction costs, such as obtaining shareholder approval or preparing and circulating certain prospectus-type information, if they engage as bidders in take-over deals classified by the Stock Exchange as Class 1 transactions. In periods leading up to the study, Class 1 status was attributed to a take over deal if the fair value of the assets being acquired (or disposed of) exceeded the book value of the acquiring (disposing) company by 15% or more (Yellow Book, Section 6). Furthermore, the book value of the acquiring company included goodwill as an asset only if capitalisation was the accounting policy used in its financial statements. We would thus predict that companies planning takeover bids which had to consider Class 1 transactions would prefer capitalisation of goodwill so as to increase their book value relative to the fair value of (probably less acquisitive) target companies and thus minimise the chance of such transactions falling within the relevant Class 1 criteria, i.e. a positive association between a preference for capitalisation and the fact that the company has needed to consider Class 1 transactions in planning bids.

### 3.2. *Information effect ('IE') hypotheses*

As noted earlier, many of the concerns about possible changes to goodwill accounting requirements in the practitioner-orientated accounting literature seem to be directly related to balance sheet and income statement impacts of goodwill accounting (e.g. Pearce, 1994). To test such alternative explanations for company preferences, we examine whether such preferences are influenced by finance directors' beliefs about how analysts will interpret any change in reported ratios and profits, particularly if they have naïve beliefs about how analysts will react. For example, would companies have a preference for the ASB to choose capitalisation-based alternatives if they believed that analysts would treat increased gearing as a sign of increased riskiness? Also, would they prefer immediate write-off methods if they believed that reduced reported profits resulting from goodwill amortisation would cause analysts to downgrade their assessment of the company?

The existence of a strong relationship between corporate management preferences and their beliefs about how analysts will react could be interpreted as suggestive of a naïve view of how the market operates—see for example the discussion in Collinson et al. (1993). Sometimes, however, there may be more complex linkages between beliefs and preferences (O'Keefe and Soloman, 1985). For example, suppose companies preferred the ASB to choose immediate write-off as the sole approach and expressed the belief that analysts consider that the immediate write-off of goodwill gives UK firms an international competitive advantage. Such a belief could stem from finance directors having a naïve view of the effects of accounting numbers and how analysts interpret them, and preferring immediate write-off because of higher reported profits under that approach. On the other hand, it could be that they believe that such competitive advantage arises because of the differences in profit-based management compensation in different countries owing to the different reported profit figures (Lee and Choi, 1992).

We also examine a number of possible other, information effect (IE)-related, beliefs. We hypothesise a positive association between the preference for capitalisation-based approaches and finance directors' beliefs that:

- capitalising goodwill would enable analysts and other users better to assess their group size relative to other groups than not doing so;
- analysts would consider the company less risky if goodwill were capitalised and gearing ratios consequently improved;
- the increased gearing ratios caused by immediate write-off compared to capitalisation and amortisation has a negative effect on the way that analysts perceive the company;
- immediate write-off distorts the inferences that analysts draw in making comparisons between companies that have grown by acquisition and those that have grown by internal growth.

We hypothesise a negative association between the preference for capitalisation-based approaches where finance directors believed that:

- analysts would downgrade their rating if their profits were lower due to enforced goodwill amortisation;
- that the widely used UK practice of immediate write-off to reserves, which results in no profit and loss account charge, gives UK companies an international competitive advantage compared to similar non-UK companies.

## 4. Sample, data and variables

### *4.1. Data sources and sample selection*

Two main data sources were used for our study: Extel's Company Research CD-ROM database and the results of a postal questionnaire survey. We utilised the former to compile a dataset giving 1994 year-end financial statement information that enabled the calculation of variables such as gearing levels and interest cover. The survey provided company data relating to contracting cost hypotheses, such as the existence and nature of debt covenant restrictions and senior management profit-based compensation contracts. Certain interaction variables, discussed later, make use of both sources.

In the survey, we asked for and obtained specific and detailed information on how goodwill was explicitly or implicitly treated in contracts—whether its treatment was based on UK GAAP, another form of GAAP or a non-GAAP basis, and for GAAP treatments, whether they were based on rolling (extant) or frozen (fixed at the time of the covenant) GAAP. As far as we are aware, this survey, sent out in December 1994, was the first of this type to be sent to all large UK listed companies. This information constitutes the only data source on the treatment of goodwill in debt covenant restrictions and management compensation contracts extensive enough for our purposes. Compared to previous UK studies (e.g., Citron, 1992a, 1995; Day and Taylor, 1995, 1996), based on smaller samples, we identified a smaller proportion of companies having non-GAAP goodwill accounting methods specified in their contracts.

Standard survey design procedures, including pre-testing, feedback meetings, and a pilot survey were utilised. To reduce response bias due to lack of knowledge of the proposals, we sent with the survey instrument a one-page summary of the ASB's Discussion Paper on goodwill accounting. We also asked about prior familiarity with the proposals and included control questions to check answer consistency. Our sampling frame comprised finance directors of those UK-incorporated companies within *The Times 1000* (1994 edition) having a stock market listing. Of the 502 such companies, 21 were used for the pilot study and 481 companies in the main survey. *Prima facie* these companies were more likely than others to be involved in take-over activity and hence have material levels of goodwill, to have formalised debt covenants and management compensation schemes, and to have an active interest in new accounting proposals. The survey instrument was mailed early in December 1994, with a second request four weeks later.[4]

The overall response rate of 58.4% (281 companies) is high for this type of survey, as is the usable response rate of 44.1% (212 companies). Analysis of the 69 unusable responses reveals no systematic biasing factors: 52% of these stated that it was company policy not to take part in surveys, 16% did not wish to take part in this particular survey, 13% cited time pressures, and the remaining 19% comprised a variety of other reasons. Respondent companies were from a broad spread of business sectors, as shown in Table 1. A Z-test showed that in 14 out of the 15 industry categories there was no significant difference between the proportion of companies responding and the proportion in the population.

Further, to assess response bias we compared respondents and non-respondents by industry grouping, gearing ratio, interest cover ratio, total assets and turnover. Kruskal-Wallis and Mann-Whitney tests showed no significant difference between the two groups. We also compared responses to first and second mailings using Chi-squared and Mann-Whitney tests. These showed that differences in responses between the groups were in line with what might be expected by chance. Financial statement characteristics, in

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[4] A copy of the survey instrument is available from the authors on request.

**Table 1**
**Industry profile of sample and overall sampling frame**

| | *Respondents* | | *Total UK-incorporated listed companies in Times 1000* | |
|---|---|---|---|---|
| *Industry* | *Number* | *%* | *Number* | *%* |
| Engineering | 42 | 19.8 | 84 | 16.7 |
| Consumer goods | 24 | 11.3 | 71 | 14.1 |
| Light industrial | 23 | 10.9 | 66 | 13.1 |
| Building materials and construction | 23 | 10.9 | 55 | 11.0 |
| Leisure | 19 | 9.0 | 52 | 10.4 |
| Chemicals, metals and other materials | 22 | 10.4 | 43 | 8.6 |
| Agriculture and food | 19 | 9.0 | 26 | 5.2 |
| Utilities | 12 | 5.7 | 25 | 5.0 |
| Transport services | 9 | 4.2 | 21 | 4.2 |
| Oils, gas, mines and nuclear | 6 | 2.8 | 12 | 2.4 |
| Business services | 3 | 1.4 | 11 | 2.2 |
| Financial | 4 | 1.9 | 7 | 1.4 |
| Communications | 2 | 0.9 | 4 | 0.8 |
| Property | 1 | 0.5 | 4 | 0.8 |
| Miscellaneous | 3 | 1.4 | 21 | 4.2 |
| Total | **212** | **100.0** | **502** | **100.0** |

Based on *The Times 1000* (1994 Edition), Times Books 1994.

terms of quartiles, of respondents and of the sampling frame as a whole are shown in Table 2.

Of individual respondents, 52% were financial directors, 23% financial controllers and 23% other accountants or managers: only 2% were comparatively junior or undeclared. Results of tests with and without such junior or undeclared respondents are very similar: those reported include this last group. All respondents were either professionally qualified and/or had an extensive background in accounting.

We are confident that preferences expressed to us reflect a corporate rather than a personal view. The questionnaire objectives made clear that we sought 'the views and preferences of large companies...'. We deliberately targeted finance directors and financial controllers so that responses would reflect appropriate seniority and decision-making power. Our analysis of respondents illustrates that our targeting strategy was successful.

## 5. The model and variables used

Because of the non-normality of the explanatory variables and the binary nature of the dependent variable, PREF, we used logistic regression to

**Table 2**
**Characteristics of respondents and sampling frame**

| *Characteristic* | *Total (usable) respondents (212) Quartiles* | | | *Total UK Listed companies in The Times 1000 (502) Quartiles* | | |
|---|---|---|---|---|---|---|
| *In £m* | *25%* | *50%* | *75%* | *25%* | *50%* | *75%* |
| Sales | 152.08 | 327.95 | 1,258.58 | 149.42 | 316.57 | 1,102.41 |
| Total assets | 110.59 | 285.77 | 1,134.70 | 111.63 | 275.64 | 999.45 |
| Profit before interest and tax | 5.83 | 22.23 | 92.33 | 6.13 | 20.09 | 75.85 |
| Gearing | 17.46% | 31.07% | 48.59% | 16.64% | 29.18% | 45.38% |
| Interest cover | 3.28 | 6.17 | 12.27 | 3.35 | 6.56 | 12.95 |

*Source:* Extel Company Research 1994 data.

**Table 3**
**Description of variables used in logistic regression model**

| *Variable* | *Description* |
|---|---|
| PREF | = 1 if company expresses a first preference for the ASB to adopt capitalisation of goodwill, and = 0 if preference is for immediate write-off. |
| GEAR | High gearing dummy = 1 if gearing level > upper quartile gearing of sampling frame companies. The gearing ratio is calculated from Extel definitions as (Total borrowings+Preference capital)/(Total borrowings+Preference capital+Ordinary capital+Reserves+Minorities − Intangibles), winsorised at 100%. The Extel definition uses the immediate write-off basis for measuring gearing. This is justified in this study on the assumption that lenders assess the relative tightness of debt covenant restrictions between companies by using a common UK comparative framework, and only then do they reformulate such restrictions in terms of the actual goodwill accounting approach used by the company |
| GEARI(1) | High gearing × Restriction. Restriction dummy = 1 if company has gearing-based debt covenant restriction[1] |
| GEARI(2) | High gearing × Restriction × Rolling GAAP. Rolling GAAP dummy = 1 if company has a rolling GAAP restriction[2] |
| INTCOV | Low Interest cover = 1 if < lower quartile interest cover of sampling frame companies. Interest cover ratio defined as (Profit before interest and taxation/Interest charge), winsorised at 50 times |
| INTCOVI(1) | Low Interest cover × Restriction. Restriction dummy = 1 if company has interest cover-based debt covenant restriction[1] |
| INTCOVI(2) | Low Interest cover × Restriction × Rolling GAAP. Rolling GAAP dummy = 1 if company has a rolling GAAP restriction[2] |
| MCOMP | = 1 if profit-based management compensation scheme exists[1] |
| MCOMPI | Profit-based management compensation scheme × Rolling GAAP. Rolling GAAP dummy = 1 if company compensation scheme has a rolling GAAP restriction[2] |
| USQ | = 1 if US quote[1] |
| CL1 | = 1 if company needed to consider the implications of London Stock Exchange Class 1 transactions in the previous five years[1] |
| UTIL | = 1 if company is in utilities sector |
| LOGSALES | Natural logarithm of sales |
| BSZ | = 1 if company felt that capitalising goodwill would enable analysts and other users better to assess their group size relative to other groups[1] |
| DRATE | = 1 if company felt that analysts would downgrade their rating if their profits were lower due to enforced goodwill amortisation[1] |
| LRISK | = 1 if company felt that analysts would consider the company less risky if goodwill were capitalised and gearing ratios consequently improved[1] |
| INTCADV | = 1 if company felt that the UK practice of immediate write-off to reserves, resulting in no profit and loss account charge, gives UK companies an international competitive advantage over similar US companies[1] |
| WGEAR | = 1 if company felt that the increased gearing ratios caused by immediate write-off compared to capitalise and amortise has a negative effect on the way that analysts would perceive the company[1] |
| DCOMP | = 1 if company felt that immediate write-off distorts analysts' inferences when making comparisons between companies that have grown by acquisition and those that have grown by internal growth[1] |
| $\text{IND}_i$ | Eight industry categories based on the London Business School database |

[1] Established by survey question. The information effect variables included an 'unsure' category, which was included in our tests, but not reported in Table 5 to preserve clarity of presentation.

[2] We established through the questionnaire that the relevant debt covenant included goodwill in the restriction calculation and did not contain a special treatment for goodwill.

evaluate the validity of our hypotheses. PREF takes the value of one if management's first preference is for capitalisation-based approaches (61 respondents) and zero for immediate write-off approaches (151 respondents).[5] Our model contained both contracting cost variables and information effect (IE) variables.

$$\begin{aligned}
&\mathrm{PREF}=\beta_0+\beta_1\ \mathrm{GEAR}+\beta_2\ \mathrm{GEARI(1)}\\
&+\beta_3\ \mathrm{GEARI(2)}+\beta_4\ \mathrm{INTCOV}+\beta_5\ \mathrm{INTCOVI(1)}\\
&+\beta_6\ \mathrm{INTCOVI(2)}+\beta_7\ \mathrm{MCOMP}+\beta_8\ \mathrm{MCOMPI}\\
&+\beta_9\ \mathrm{USQ}+\beta_{10}\ \mathrm{CL1}+\beta_{11}\ \mathrm{UTIL}+\beta_{12}\ \mathrm{LOGSALES}\\
&+\beta_{13}\ \mathrm{BSZ}+\beta_{14}\ \mathrm{DRATE}+\beta_{15}\ \mathrm{LRISK}+\\
&\beta_{16}\ \mathrm{INTCADV}+\beta_{17}\ \mathrm{WGEAR}+\beta_{18}\ \mathrm{DCOMP}\\
&+\Sigma\ \beta_i\ \mathrm{IND}_i
\end{aligned}$$

The variables are described in Table 3. In testing the contracting cost issues discussed above we use a model based on categorical variables. In this model, main effect variables include the existence of profit-based management compensation plans (MCOMP); and debt covenant restrictions (for which we used one type of balance sheet restriction, gearing level (GEAR), which takes the value one for high-geared firms and zero otherwise, and one income statement-based restriction, interest-cover (INTCOV), which takes the value one for low interest cover firms and zero otherwise); the presence of a US quote (USQ); the active consideration of Class 1 Transactions (CL1); whether or not the company is a utility (UTIL); and size (LOGSALES). The variables used to test the information effect hypotheses directly relate to the hypotheses outlined earlier and so are not discussed further here.[6]

The earliest studies on contracting costs and accounting choice used only continuous main effect explanatory variables, such as gearing and interest cover ratios, to measure the effects of debt covenant restrictions. Such an approximation for measuring 'binding' restrictions was criticised as being inexact (Duke and Hunt, 1990; Press and Weintrop, 1990). Later studies used simple interaction effects to refine measurement, by measuring the effects of gearing or interest cover designated 'high' or 'low' relative to medians (e.g. Ayres, 1986; Dunne, 1990). Our study contains further refinements: we use quartiles to reflect more plausibly the point at which gearing and interest cover restrictions become binding, and categorical variables to challenge the assumption implicit in the continuous model that the degree of 'bindingness' (and therefore the consequences of breakage of debt covenant restrictions) increases in a linear fashion beyond the upper or lower quartile point. We argue that it is more reasonable to assume that debt covenant restrictions only become binding beyond a particular point and not before (though we find similar results, discussed later, when continuous variables are used). In addition, we focus on higher level interaction terms to target more exactly firms having binding restrictions of the relevant type, i.e. based on rolling GAAP (Mohrman, 1996).

Our hypotheses and modelling are thus based on interaction and not main effect terms. For example, GEAR, with its coefficient, $\beta_1$, is the incremental effect in log-odds ratio terms of high-geared firms over low-geared firms. GEARI(2), the highest level interaction variable, with coefficient $\beta_3$, can be interpreted as the incremental effect of the simultaneous presence of high gearing and rolling GAAP debt covenant restrictions over merely the presence of high gearing and debt covenant restrictions which are *not* based on rolling GAAP. Thus, $\beta_1+\beta_2+\beta_3$ measures the contracting cost effect for high geared firms with gearing restrictions based on rolling GAAP. $\beta_1+\beta_2$ measures the effect for the remaining highly geared firms with gearing restrictions, but not based on rolling GAAP. $\beta_1$ measures the effect for the rest of the firms which are high geared but do not have gearing debt covenant restrictions. We do not model all possible main effects and interaction terms, for example measuring the existence of a debt covenant restriction per se, as we are only interested in incremental effects relating to gearing.

Our main contracting cost hypotheses relate only to highest-level interaction terms such as GEARI(2), where we predict that $\beta_3$ will be significant and positive, i.e. a positive association between management preference for capitalisation-based approaches and gearing level for high geared companies (above the top quartile) where there is *also* a rolling-GAAP debt covenant restriction. If any of these conditions were not met, for example if GAAP were non-rolling, contracting cost theory would not predict any particular association. Similarly we predict that the coefficient of INTCOVI(2) will be negative, i.e. the incremental interest cover effect for companies with binding interest cover restrictions, having rolling GAAP-based interest cover restrictions and with interest cover below the bottom quartile. We also hypothesise that only where there are rolling GAAP-based profit-based management compensation plans will this influence management preferences, so we predict that $\beta_8$ the regression coefficient of MCOMPI, will be negative.

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[5] The former are alternatives i, ii, and iii in the ASB's 1993 DP, as detailed in footnote 1, and the latter alternatives iv, v and vi. Alternative specifications were also tested: see Section 6.

[6] Many of the survey questions upon which our variables are based allowed responses of 'yes', 'no' or 'unsure'. The 'unsure' category was included in our tests for information effect variables. While this reduces the power of the tests somewhat and therefore makes our results conservative, it avoids artificially constraining the responses. We only report results for 'yes' versus 'no' in our tables because reporting the 'unsure' results would overload with detail an already complicated presentation, and we do not have formal hypotheses for the comparisons with 'unsure'. (As might be expected though, the results for 'yes' versus 'unsure' were generally in a similar direction to those for 'yes' versus 'no' but showed less significance.) We did not include an 'unsure' category for the contracting variables because to do so would have exponentially increased model complexity. There were also fewer such answers.

Our use of non-interaction (GEAR, INTCOV and MCOMP) and lower level interaction variables (e.g. GEAR (1)) is merely to proxy for omitted variables. We also use industry to control for omitted variables correlated with industry effects, e.g. capital intensity and differential financing regimes.

A correlation matrix for the main effect variables is shown in Table 4. A number of significant correlations are apparent but the following points may be made. The correlation between interest cover and gearing level is dealt with in our sensitivity analyses where we fit models with each individually. As might be expected, industry classification (which includes utilities) is correlated with two contracting cost variables. This may lead to some understatement of the strength of our results, and thus they should be seen as conservative. LOGSALES is correlated with our transaction cost variables. We hypothesise that they operate in the same direction, and so would not expect the effect of each to mask the others. We specifically address correlations between contracting cost and information effect variables by also fitting separate models for each category of variables (see Section 6). The correlation between some of the information effect variables is significant, but this does not prevent many of these variables proving individually significant in the tests reported later, though the level of significance of individual variables may therefore again be understated.

## 6. Results

The main results are shown in Table 5. The model has very good overall explanatory power as shown by its log-likelihood ratio (model chi-square), overall fit and goodness-of-fit statistic. Individual variables act generally in the directions hypothesised and a number of them are highly significant.

Results for individual variables provide considerable support for contracting-cost effects. Binding highest level interaction gearing and management compensation contracting effects are in the directions hypothesised, GEARI(2) being positive and MCOMPI negative, and are highly significant. The binding interest cover contracting effect, INTCOVI(2) is not significant, although its sign is as predicted. Other, non-agency, contracting variables are of the hypothesised sign, except the consideration of Class 1 transactions, CL1, which has the opposite sign to that predicted, but none are significant.[7] Certain control variables are significant (INTCOV) or marginally significant (INTCOVI(1) and MCOMP).

Four IE variables are also significant at the 5% level or better, and five have the predicted sign. BSZ, the belief that capitalisation and amortisation would enable analysts better to assess the size of the company, is very highly significant. Significant at the 5% level are DRATE, the belief that capitalisation and amortisation leads to analysts down-rating the company, INTCADV, the belief that the practice of immediate write-off to reserves gives UK companies an international competitive advantage, and DCOMP, the belief that the method of goodwill accounting distorts comparisons between companies that have grown by acquisition and those which have grown by internal means.

Sensitivity analysis included fitting a model where gearing and interest cover levels were measured as continuous variables consistent, as discussed earlier, with previous studies: other sensitivity analyses on the model were conducted as follows:

i) Measuring the tightness of debt covenant restrictions both in terms of population medians and industry quartiles.[8]

ii) Fitting models with debt covenant restrictions based on gearing variables only, and then with interest cover variables only.

iii) Fitting models based on contracting variables only and information effect variables only, for each of the sensitivity runs in i) and ii).

v) Restricting contracting and information effect only models to the same cases as the main model.

iv) Remeasuring the dependent variable PREF using different groupings of the six goodwill accounting alternatives given in the ASB's 1993 DP.[9]

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[7] One reviewer has pointed out that our results for the US-quote variable, USQ, may have been contaminated to a certain extent by our survey questions not distinguishing between a full US quotation and where company securities are traded as American Depository Receipts. With hindsight it would have been better to distinguish these. We address this ambiguity by instead re-running the model using a variable based on another survey question, whether the company produces a reconciliation to US GAAP, such as the SEC form 20-F. This use of the redefined variable produces a similar result to that reported, indicating that not distinguishing between the two types of US listing is unlikely to have affected the results.

[8] This was to capture any tendency for lenders to set the values of individual covenants to industry levels (even though they would also recognise individual company circumstances as well). This also addresses industry-specific accounting effects.

[9] The six alternatives are given in footnote 1. Differentiating capitalisation (alternatives i, ii and iii) and immediate write-off approaches (alternatives iv, v and vi), as in our main tests, is undeniably best for capturing balance sheet effects. It also captures income statement effects to a large extent, since alternatives i, ii and iii all have income statement effects. However, case vi also has some income statement effect. Therefore the second specification used differentiated alternatives i, ii, iii and vi from alternatives iv and v (which have no income statement

**Table 4**
**Correlation matrix of base variables: Spearman rank correlations**

| *Variable* | GEAR | INTCOV | MCOMP | USQ | CL1 | IND | LOGSALES | BSZ | DRATE | LRISK | INTCADV | WGEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GEAR | | | | | | | | | | | | |
| INTCOV | 0.273*** | | | | | | | | | | | |
| MCOMP | 0.091 | 0.041 | | | | | | | | | | |
| USQ | (0.124)* | (0.029) | 0.016 | | | | | | | | | |
| CL1 | (0.113) | 0.048 | (0.097) | (0.008) | | | | | | | | |
| IND | (0.092) | 0.036 | (0.128)* | (0.093) | 0.131* | | | | | | | |
| LOGSALES | 0.176** | (0.138)** | (0.057) | (0.359)*** | (0.116)* | 0.123* | | | | | | |
| BSZ | 0.009 | 0.018 | 0.004 | (0.082) | (0.057) | 0.160** | (0.044) | | | | | |
| DRATE | 0.100 | 0.003 | 0.070 | 0.006 | 0.010 | (0.079) | (0.196)*** | 0.071 | | | | |
| LRISK | 0.131* | 0.037 | 0.028 | 0.006 | (0.099) | 0.062 | (0.103) | 0.345*** | 0.297*** | | | |
| INTCADV | 0.054 | 0.063 | 0.064 | (0.057) | (0.050) | 0.047 | 0.028 | 0.111 | 0.171** | 0.054 | | |
| WGEAR | 0.092 | 0.124* | (0.054) | (0.093) | (0.110) | 0.072 | (0.142)** | 0.225*** | 0.255*** | 0.416*** | 0.058 | |
| DCOMP | (0.035) | 0.059 | (0.009) | 0.091 | (0.063) | 0.070 | (0.099) | 0.287*** | 0.119* | 0.311*** | 0.169** | 0.446*** |

* significant at 10% level
** significant at 5% level
***significant at 1% level
Bracketed figures are negative correlations

**Table 5**
**Results of logistic regression of company preference for desired ASB goodwill treatment (1 = capitalisation, 0 = immediate write-off) against contracting and information effect variables**

*Model:*

$$PREF=\beta_0+\beta_1\ GEAR+\beta_2\ GEARI(1)+\beta_3\ GEARI(2)+\beta_4\ INTCOV+\beta_5\ INTCOVI(1)+\beta_6\ INTCOVI(2)+\beta_7\ MCOMP+\beta_8\ MCOMPI+\beta_9\ USQ+\beta_{10}\ CL1+\beta_{11}\ UTIL+\beta_{12}\ LOGSALES+\beta_{13}\ BSZ+\beta_{14}\ DRATE+\beta_{15}\ LRISK+\beta_{16}\ INTCADV+\beta_{17}\ WGEAR+\beta_{18}\ DCOMP+\Sigma\ \beta_i\ IND_i$$

| *Variable name* | *Hypothesised coefficient sign* | *Coefficient* | *Significance level* |
|---|---|---|---|
| Intercept | | −5.734 | (0.525) |
| GEAR | | −2.760 | (0.571) |
| GEARI(1) | | −0.104 | (0.984) |
| GEARI(2) | | 8.375 | (0.003)*** |
| INTCOV | | 3.926 | (0.028)** |
| INTCOVI(1) | | −4.057 | (0.065)* |
| INTCOVI(2) | − | −0.009 | (0.499) |
| MCOMP | | 2.746 | (0.086)* |
| MCOMPI | − | −4.445 | (0.010)*** |
| USQ | + | 0.976 | (0.286) |
| CL1 | + | −0.786 | (0.212) |
| UTIL | | −2.423 | (0.391) |
| LOGSALES | + | 0.224 | (0.292) |
| BSZ | + | 7.158 | (0.000)*** |
| DRATE | − | −2.461 | (0.037)** |
| LRISK | + | 1.970 | (0.150) |
| INTCADV | − | −2.200 | (0.025)** |
| WGEAR | + | −1.965 | (0.101) |
| DCOMP | + | 1.729 | (0.050)** |
| IND | | all neg | (0.456) |
| No. of cases | | 148 | |
| Overall fit (% of correct classifications) | | 92.57% | |
| Model $\chi^2$ | | 111.605 | (0.000)*** |
| df | | 29 | |
| Goodness-of-fit | | 83.394 | |

Figures provided for each variable are the regression coefficient and the p value (*significant at 10% level, **significant at 5% level, ***significant at 1% level). Where hypothesised coefficient signs are given, the p value for such directional hypothesis is for one-tailed test: otherwise tests are two-tailed.

Variations in the results of the analyses are greatly outweighed by their common features. The effect of measuring gearing and interest cover as continuous variables hardly changes the overall model fit. Contracting cost effects in this model are very similar to the main model, except that the management compensation variable is significant at the 5% rather than the 1% level. IE effect variables in the continuous model are more highly significant than contracting cost variables.

In nearly all the sensitivity analyses the binding rolling GAAP gearing restriction variable is highly significant in the hypothesised direction, while the binding rolling GAAP management compensation variable has the predicted sign in all sensitivity tests and is significant at the 5% level in the great majority of runs. The binding rolling GAAP interest cover variable is rarely significant. Although as expected, the explanatory power of the median-based model is lower, it is one of only two to indicate any statistical significance for this variable. It also shows lower significance for some information effect variables, but BSZ retains its pre-eminence. In the industry-based quartile model, the binding rolling GAAP gearing restriction variable is less significant than in all the other runs.

When interest cover variables are run without gearing variables, the model $\chi^2$ falls, which confirms our impression that management preferences were not greatly driven by interest cover contract-

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effect). An even better specification of major income statement effects might have been to differentiate alternatives ii and iii from the rest, but the smaller number of cases in these categories results in a loss of test power. To the extent that there is any mis-specification, our results for variables defined in income statement terms will be too conservative.

ing cost variables. Whether a company is in the utilities sector is generally not significant, giving only very weak support to the political costs hypothesis. Contracting cost-only models have less explanatory power than information effects only models, and tend not to have a significant fit, whereas the latter are all highly significant. Shifts in coefficients between partial models and the main model suggest, as might be expected, omitted variables.

Restricting the overall models to the same cases produces no major changes. Changing the definitional groupings for the dependent variable results in lower significance for the binding rolling GAAP gearing variable and higher significance for the rolling GAAP management compensation variable, as might be expected, while the main information effect variables continued to be significant.

The overall results of the sensitivity analysis therefore suggest a high level of robustness of the model to alternative specifications.

## 7. Summary and conclusions

Our study examines empirically factors influencing UK corporate managements' preferences for goodwill accounting. In so doing, it utilises the window of opportunity that arose in 1994 when the UK Accounting Standards Board was undecided on the issue and was canvassing constituents on how it should proceed towards the development of a standard. The study is novel in that it combines financial data derived from a commercial database with survey data to specify contracting cost hypotheses more precisely than in previous studies. We use interaction variables more exactly to specify binding factors likely to influence management. Our study is also novel in examining non-contracting factors reflecting management's beliefs about market perceptions of their companies.

Our results indicate that management's preferences for accounting for goodwill were influenced by factors consistent with a contracting cost framework. Both binding gearing-based debt covenant restrictions and profit-based management compensation schemes were found to be significant in the direction hypothesised, but interest cover-based covenant restrictions much less so.

In addition, our results show that corporate managements' goodwill accounting preferences are also influenced to a great extent by their beliefs about how the stock market (represented by financial analysts) would respond to the financial statement impact of changes in standards. The most significant IE variables relate to management's belief that capitalisation of goodwill would allow analysts better to assess the size of their company; that analysts would downgrade their rating if their company's profits were lower due to enforced goodwill amortisation; that immediate write-off methods gives UK companies an advantage in international take-over contests; and that immediate write-off causes difficulties for analysts when compairing companies that grew organically and those that grew by acquisition. However, the impacts of these last three are not as strong as that relating to beliefs about the assessment of size. This particular variable could be interpreted in a number of ways:

- in terms of managements having 'omitted asset' concerns, believing that the absence of goodwill from their balance sheet gives a false view of the company and possibly that it is 'better' accounting to include it;
- in functional fixation terms, that management wished the company to be seen as a larger company; or
- in 'market' terms, that management intuited what has been found in US empirical studies (see footnote 2) that there is correlation between reported balance sheet goodwill and market values.

Overall, our sensitivity analyses indicate that our results are robust to differing model specifications.

Two of the novel features of our study are showing the importance of utilising high-level interaction terms in modelling contracting cost variables, and of defining bindingness more rigorously, e.g. using quartiles rather than medians. We feel that a similar approach could also usefully be applied to similar empirical studies in other areas of accounting. Further research is needed on a number of issues: into modelling more explicitly the costs of covenant breaches, the relative magnitudes of different types of contracting costs, and on gaining a better understanding of the sources and development of management beliefs.

Our work also has policy implications. It indicates that the ASB needs to take account of potential contracting costs imposed on companies by changes in accounting standards. The Board should also be sensitive to managements' concerns about how such changes will affect the way that the market perceives their companies. Failure sufficiently to appreciate the perceived importance of both issues may result in unwelcome adverse reaction to proposed changes and lobbying against them. The factors we find driving preparers' thinking are relevant as a starting point for its deliberations on future accounting issues.

In arriving at these conclusions, the usual caveats about using survey data should be noted, though such an approach was the only way to collect important non-publicly available data.

## References

Accounting Standards Board (1993). *Goodwill and Other Intangible Assets*. Discussion paper. London: ASB

Accounting Standards Board (1995). *Goodwill and Intangible Assets.* Working paper. London: ASB.

Accounting Standards Board (1996). *Goodwill and Intangible Assets.* Financial Reporting Exposure Draft 12 (June). London: ASB.

Accounting Standards Board (1997). *Goodwill and Intangible Assets.* Financial Reporting Exposure Standard 10 (December). London: ASB.

Accounting Standards Committee (1984). *Accounting for Goodwill* SSAP 22 (December). London: ASC.

Accounting Standards Committee (1990a). *Accounting for Goodwill.* Exposure Draft 47 (February). London: ASC.

Accounting Standards Committee (1990b). *Consolidated Accounts* Exposure Draft 52 (June). London: ASC.

Arnold, J., Eggington, D., Kirkham, L., Macve, R. and Peasnell, K. (1992). *Goodwill and Other Intangibles: Theoretical Considerations and Policy Issues.* London: ICAEW.

Ayres, F. L. (1986). 'Characteristics of firms electing early adoption of SFAS 52'. *Journal of Accounting and Economics,* 8: 143–158.

Barwise, P,. Higson, C., Likierman, A. and Marsh, P. (1989). *Accounting For Brands.* London: ICAEW.

Barth, M. and Clinch, G. (1996). 'International accounting differences and their relation to share prices: evidence from UK, Australian, and Canadian firms'. *Contemporary Accounting Research,* 13 (1) (Spring): 135–170.

Chauvin, K. W. and Hirschey, M. (1994). 'Goodwill, profitability, and the market value of the firm'. *Journal of Accounting and Public Policy,* 13: 159–180.

Choi, F. D. S. and Lee, C. (1991). 'Merger premia and national differences in accounting for goodwill'. *Journal of International Financial Management and Accounting,* 3: 219–240.

Citron, D. (1992a). 'Accounting measurement rules in UK bank loan contracts and accounting policy choice'. *Accounting and Business Research,* 23 (Winter): 21–30.

Citron, D. (1992b). 'Financial ratio covenants in UK bank loan contracts and accounting policy choice'. *Accounting and Business Research,* 22 (Autumn): 322–335.

Citron, D. (1995). 'The incidence of accounting-based covenants in UK public debt contracts: an empirical analysis'. *Accounting and Business Research,* 25 (Summer): 139–150.

Collinson, D. J., Grinyer, J. R. and Russell, A. (1993). *Management's Economic Decisions and Financial Reporting.* London: ICAEW.

Day, J. F. S. and Taylor, P. J. (1994). 'Accounting aspects: room for improvement'. *Accountancy* (June): 129.

Day, J. F. S. and Taylor, P. J. (1995). 'Evidence on the practices of UK bankers in contracting for medium-term debt'. *Journal of International Banking Law* (September): 394–401.

Day, J. F. S. and Taylor, P. J. (1996). 'Loan contracting by UK corporate borrowers'. *Journal of International Banking Law* (August): 318–325.

Duke, J. C., and Hunt, III H. G. (1990). 'An empirical analysis of debt covenant restrictions and accounting related debt proxies'. *Journal of Accounting and Economics,* 12: 45–65.

Dunne, K. M. (1990). 'An empirical analysis of management's choice of accounting treatment of business combinations'. *Journal of Accounting and Public Policy,* 9: 111–133.

Grinyer, J. R. Russell, A. and Walker M. (1991). 'Managerial choices in the valuation of acquired goodwill in the UK'. *Accounting and Business Research,* 22 (Winter): 51–55.

Healy, P. M. (1985). 'The effects of bonus schemes on accounting decisions'. *Journal of Accounting and Economics,* 7: 85–107.

Jennings, R., Robinson, J., Thompson, III R. B. and Duvall, L. (1996). 'The relationship between accounting goodwill numbers and equity values'. *Journal of Business Finance and Accounting,* 23(4) (June): 513–533.

Lee, C. and Choi, F. D. S. (1992). 'Effects of alternative goodwill treatments on merger premia: further empirical evidence'. *Journal of International Financial Management and Accounting,* (Autumn): 220–236.

Leuz, C., Deller, D. and Stubenrath, M. (1998). 'An international comparison of accounting-based payout restrictions in the United States, United Kingdom and Germany'. *Accounting and Business Research,* 28(2) (Spring): 111–129.

Lin, Y. C. and Peasnell, K. V. 'Fixed asset revaluation and equity depletion in the UK'. *Journal of Business Finance and Accounting.* Forthcoming.

McCarthy, M. G. and Schneider, D. K. (1995). 'Market perception of goodwill: some empirical evidence'. *Accounting and Business Research,* 26(1) (Winter): 69–81.

Mather, P. R. and Peasnell, K. V. (1991). 'An examination of the economic circumstances surrounding decisions to capitalise brands'. *British Journal of Management,* 2: 151–164.

Mohrman, M. B. (1996). 'The use of fixed GAAP provisions in debt contracts'. *Accounting Horizons,* 10 (3) (September): 78–91.

Ohlson, J. A. (1995). 'Earnings book value and dividends in security valuation'. *Contemporary Accounting Research,* 11(2) (Spring): 661–687.

O'Keefe, T. B. and Soloman, S. Y. (1985). 'Do managers believe the efficient markets hypothesis? Additional evidence'. *Accounting and Business Research,* 15 (Spring): 67–80.

Pearce, C. (1994). 'Wrong in theory and wrong in practice'. *Accountancy* (June): 97.

Press, E. and Weintrop, J. (1990) 'Accounting-based constraints in public and private debt agreements: the association with leverage and impact on accounting choice'. *Journal of Accounting and Economics,* 12: 65–97.

Skerratt, L. (1980). *Survey of published Accounts 1979.* London: ICAEW.

Smith, C. and Warner J. (1979). 'On financial contracting: an analysis of bond covenants'. *Journal of Financial Economics,* 7: 117–161.

Times Books (1994). *The Times 1000 — 1994.* London.

Watts, R. L. and Zimmerman, J. (1990). 'Positive accounting theory: a ten year perspective'. *The Accounting Review,* 65(1) (January): 131–156.

Weetman, P. and Gray, S. (1991). 'A comparative analysis of the impact of accounting principles on profits: the USA versus the UK, Sweden and the Netherlands'. *Accounting and Business Research,* 21(84) (Autumn): 363–380.

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# Motives underlying the method of payment by UK acquirers: the influence of goodwill

**Alan Gregory***

**Abstract**—The treatment of goodwill in the UK has been the subject of a recent contentious Financial Reporting Standard, FRS 10. It is shown that goodwill write-off considerations appear to have an influence on the form of payment used in the acquisition, and that this influence is associated with the relative portion of the acquirer's net worth which is available for write-offs and the ratio of goodwill to target asset value. These findings are robust to controlling for factors shown to have influenced the choice of acquisition financing by Martin (1996), and to additional controls for any over-valuation of equity. The result that the accounting treatment of goodwill is associated with the financing decision in an acquisition is one that may have important policy implications for UK accounting.

## 1. Introduction

Recent studies of the performance of acquiring firms in both the US and the UK show a consistent pattern of poor long-run post-acquisition performance. In the US, Agrawal, Jaffe and Mandelker (1992) show significant post-merger cumulative abnormal returns (CARs) of −7.38% after three years, and −10.26% after five years.[1] In the UK, research in recent years has included that by Limmack (1991), Sudarsanam, Holl and Salami (1996) and Gregory (1997). All of these papers report negative acquirer performance. An exception to this general finding is that of Higson and Elliott (1998), who report insignificant abnormal returns of −1.14% after 24 months and +0.83% after 36 months. Gregory (1997) examines the sensitivity of the conclusions drawn by these studies to the benchmark and returns accumulation method used. The results from all of the models are that the two-year post-takeover performance of acquirers is significantly negative.[2]

The literature that investigates the impact of factors on long-run post-bid returns seems unanimous in finding equity financing acquirers perform significantly worse than acquirers who use cash or mixed consideration (Agrawal et al., 1992; Gregory, 1997; Loughran and Vijh, 1997). This naturally leads to an interesting research question. If acquirers who purchase targets through equity have systematically poorer returns than cash acquirers, what motivates acquirers to use this method of financing?

The focus in this paper is the role that accounting considerations may have in the determination of acquisition financing. Goodwill is an issue of particular interest, given the controversy surrounding attempts to reform SSAP 22. The Accounting Standards Board recently introduced a new Financial Reporting Standard (FRS 10), which will force a change in the way in which the majority of UK companies account for goodwill arising on takeover (Higson, 1998). This is the culmination of a project that the Accounting Standards Committee started in the late 1980s (ASB, 1997: 46). Previous attempts to change the provisions of SSAP 22 have met with considerable criti-

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[1] Agrawal et al. show that the contrary finding of no significant abnormal performance by Franks, Harris and Titman (1991) is specific to the time period of that study.

[2] Any study of long-run abnormal returns must address the possibility of bias in the computation of abnormal returns and their associated test statistics. However, Kothari and Warner (1997) show that when abnormal performance is negative, using APIs is likely to lead to *under* rejection of the null hypothesis. Thus bias is extremely unlikely to explain the general conclusions on post-takeover performance drawn by Limmack (1991), Kennedy and Limmack (1996) and Gregory (1997), all of which report results using APIs. API returns are biased by being positively skewed: CARs exhibit less skewness, although use of CARs can lead to over-rejection of the null.

cism (ASB, 1997: 48–49; Higson, 1998: 142). Even the current FRS contains a dissenting view (ASB, 1997: 70–74). The ASB clearly takes the view that the previous SSAP 22 provisions could mislead users of accounting information and that there is a clear need for reform (ASB, 1997: 47–50). Given that the debate surrounding this reform has gone on for nearly a decade, it seems pertinent to examine whether or not there have been any measurable economic consequences associated with the SSAP 22 rules. It is important to recognise that these UK accounting rules, which applied during the period of this study, allowed companies considerable flexibility in managing their post-acquisition reported earnings (Higson, 1998). It is reasonable to suppose that acquiring management would value such flexibility, and that, as such, goodwill write-off considerations may be capable of influencing the consideration offered in a takeover.

Two previous UK studies have documented a relationship between goodwill write-off and the propensity to use equity financing (Higson, 1990; Salami and Sudarsanam, 1996). The demonstration of such a relationship is insufficient to justify the conclusion that goodwill write-off considerations influence the form of financing in an acquisition *per se*. Besides the usual econometric problem of inferring causality from a regression, which affects this paper equally, there is the central difficulty that goodwill write-off capability is a function of several factors. The exact functional relationships depend upon how 'goodwill write-off capability' is defined, but as a minimum these factors will include some variable that reflects the relative size of acquirer and target. Thus it is possible that showing an *apparent* relationship between goodwill write-off capability and financing choice may merely be a manifestation of relative size being an influence upon financing. Such an association between relative size and the use of equity financing would be expected under a risk-sharing theory of financing choice (Hansen, 1987; Martin, 1996).

Accounting considerations might also be capable of influencing corporate behaviour in other ways. Anecdotal evidence suggests that earnings dilution still remains an issue in takeovers. Although sound theoretical arguments can be given for the irrelevance of earnings dilution, as Cooke (1986: 135) notes, price/earnings (PE) ratios 'remain an important influence on takeovers'. Earnings dilution is more likely to be an issue in an equity-financed takeover, and dilution might, therefore, be capable of influencing acquisition financing.

In order to investigate the importance of accounting considerations in the financing of UK takeovers, this paper firstly reviews the literature on financing choice. Second, formal hypotheses concerning the choice of financing method are set out and the determinants of financing are investigated. Finally, the findings and possible policy implications are summarised.

## 2. Previous literature

Previous investigations of factors influencing the choice of financing method in the US include Hansen (1987), Fishman (1989), Eckbo, Giammarino and Heinkel (1990) and Martin (1996). Martin's empirical study is the most recent of these, developing hypotheses from theories of financing structure and incorporating the conclusions of earlier papers. In the UK, the only work in this area has been by Higson (1990) and Salami and Sudarsanam (1996). Higson (1990) shows that the ratio of goodwill to bidder's net worth is positively related to the likelihood of an equity offer. He also finds that the bidder's excess return over the two quarters prior to the bid is positively related to the probability of the consideration being in the form of shares, while the ratio of cash to total bidder assets is negatively related to the propensity to use equity.

Salami and Sudarsanam (1996) show that bidders use more equity than expected in order to qualify for either merger accounting or acquisition accounting with merger relief, and that one of the determinants of accounting policy in takeovers is the size of the goodwill arising from the acquisition. These findings may well have important policy implications for UK accounting. However, there are difficulties with the way goodwill is treated in both of these papers. Both papers use goodwill as a proportion of the bidder's net assets as the proxy for the capability of writing off goodwill. Salami and Sudarsanam (1996) also use the log of the ratio of the bidder's revenue reserves to acquisition cost minus the book value of the target, but only when investigating whether goodwill is written off to the merger reserve or the revenue reserve. The concern in this paper is whether or not goodwill write-off considerations are capable of influencing the choice of financing method used in the acquisition. It is therefore imperative that the proxy for goodwill write-off avoids possible distortions caused either by the presence of negative goodwill, or by the case where the bidder has negative reserves or book value of equity.

Furthermore, as noted above, merely showing that goodwill write-offs are associated with the form of financing does not necessarily indicate that it is the associated accounting practice that is influencing the consideration used. It is perfectly possible that goodwill write-off could be proxying for the bid premium, or the relative size of the target compared to the acquirer. If the practice of writing-off goodwill really does influence the choice of financing method, then we should expect that breaking down the goodwill write-off into its component parts (following Higson, 1998) would reveal that either the goodwill to asset ratio of the target or the portion of acquirer net worth available for write-off are associated with financing choice.

For the period of this study, the relevant accounting treatments of goodwill were determined (post-1 January 1985) by SSAP 22, SSAP 23 and the Companies Acts, 1981, 1985. In the UK, goodwill arises when acquisition accounting is used. SSAP 22 required that goodwill should normally be eliminated by immediate write-off to reserves, although para. 41 allowed the alternative of capitalisation and amortisation. Acquisition accounting (the 'purchase' method in US terms) had to be used when the conditions laid down by SSAP 23 for merger accounting (or 'pooling' in US terms) were not met; broadly, these required a 90% acceptance of the offer, that 90% of the fair value of the amount paid had to be in the form of equity, and that the pre-bid shareholding of the acquirer had to have been less than 20% at the time of the offer.[3] However, as Sudarsanam (1995: 172) shows, merger accounting is not widely used by acquirers in cases where it could be. The preferred method in these cases appears to be acquisition accounting with merger relief. The Companies Act 1985 (s.131) allows relief from having to account for share premiums on issues for the purposes of acquisitions, something otherwise required by s.130(1) where shares are issued for consideration in excess of nominal values. Merger relief involves the difference between nominal value and fair value of the equity offered for the target being credited to a merger reserve (instead of a share premium account);[4] under SSAP 22 the merger reserve was then available for the write-off goodwill.[5] Furthermore, the use of acquisition accounting requires the target's assets to be re-stated at 'fair value' and in practice this has allowed acquirers to be somewhat imaginative in their interpretation of the term (Smith, 1992).

The final advantage of acquisition accounting, which has again been exploited in a creative fashion (Smith, 1992), is that SSAP 22 allowed the acquiring firm to provide for post-acquisition reorganisation costs.[6] Smith (1992) provides the example of Coloroll's acquisition of John Crowther,[7] where the total goodwill written off, after allowing for re-statement of the target's assets to 'fair value' and making provision for future cost provisions, actually exceeded the consideration paid for the company. The treatment of goodwill during the period of this study (now superseded by FRS 10) was at odds with both IAS 22 and the US treatment (APB Opinion No. 17, 1970). A strong theoretical case can also be made against allowing the immediate write-off of goodwill to reserves, on the grounds of profit distortion and possible bias against real investment in the economy (Arnold et al., 1993). Generally, the preferred treatment internationally is capitalisation followed by amortisation.

From an efficient markets perspective, the accounting treatment of an acquisition should make no difference to market perceptions of the acquirer, provided full disclosure of the relevant numbers is given. Neither should the accounting treatment of goodwill have any influence upon the consideration offered. In principle, goodwill can be 'written off' whether or not there is any reserve against which to charge it. It can simply be carried as a debit balance within equity (see Davies et al., 1994: 292–9: an example of this treatment is Guinness (1993 Annual Report and Accounts)). This ability to write off goodwill in any event gives rise to the null hypothesis to be examined here. However, anecdotal claims can be found that the treatment of goodwill can affect the consideration method and price paid, with complaints sometimes arising that UK firms have an unfair advantage over their US counterparts when bidding for American targets (see Higson, 1990: 12–13). Furthermore, write-offs to a negative goodwill reserve, and write-offs through the medium of a merger reserve, have very different implications for the apparent gearing ratio of the company.[8] This may also have consequential effects on any debt covenants the company has.

From an accounting perspective, it is also possible that the focus of investment analysts on price-earnings valuation methods (Arnold and Moizer, 1984; Day, 1986) may imply a concern with the impact of the takeover on PE ratios (Cooke et al., 1994). In the case of equity-financed acquisitions, it may therefore be the case that earnings dilution is an important consideration, and this is tested for in this paper. The only evidence presented on this matter for the UK is in Cooke et al. (1994, p.142), where it was found that the

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[3] Although it was apparently straightforward to circumvent this by selling any excess holding to a third party, and buying back that proportion after the offer had been made (Davies, Paterson and Wilson, 1994: 218).

[4] Davies et al. (1994: 246) note that there is some debate as to whether merger relief is actually compulsory.

[5] For a review and discussion of accounting for takeovers and mergers see Arnold et al. (1993).

[6] FRS 7, effective for accounting periods commencing from 23 December 1994, prevents the use of provisions for future reorganisation costs and losses being included as costs of the acquisition.

[7] This particular acquisition is included in the sample used in this paper.

[8] However, there are other methods for dealing with goodwill arising on an acquisition, including re-classifying goodwill as brand values and adjusting fair values to minimise goodwill, within the constraint of providing a 'true and fair' view of the company's affairs.

PE ratio the acquirer pays for the target is higher than that of the acquirer itself, on average (18.9 as opposed to 16.7). However, that study was mainly concerned with the investigation of exchange ratios in mergers, and no tests were carried out on non-equity-financed takeovers.

While, in an efficient markets sense, the accounting considerations referred to above can be viewed as 'irrational' possible determinants of the method of payment for the target company, the findings of Martin (1996) suggest that a number of 'rational' factors may be of importance. First, drawing upon the models of Myers and Majluf (1984) and Jung, Kim and Stulz (1995) which argue that, because of the extra discretion it confers, managers with growth objectives prefer to raise equity rather than debt,[9] he hypothesises that the firm's investment opportunities determine the financing of the acquisition.

Second, based upon the theoretical work of Hansen (1987), Martin examines the risk-sharing hypothesis, the argument being that the greater the uncertainty over the valuation of the target, the higher the probability that the bidder will pay in equity to force the target shareholders to take on some of the risks of over-paying.

Third, given Myers' (1984) pecking order theory of financing, with the claimed preference for internal financing, and Jensen's (1986) free cash flow hypothesis, Martin examines whether the acquirer's ability to pay for the target matters (the 'cash availability hypothesis'). US legislative requirements mean that equity offers are less speedy than cash offers, rendering cash as the main method of financing hostile offers (Martin, 1996: 1233). Although Martin finds bid hostility to be an important determinant of financing method in the US, the same barriers to hostile equity offers do not exist in the UK, and there is less reason to expect hostile offers to be cash offers. Finally, Martin draws on the findings of earlier research by Marsh (1982) and Choe, Masulis, and Nanda (1993) on equity and debt issues to suggest that the business cycle may be expected to influence the financing choice for the acquisition.

## 3. The motives underlying the choice of consideration

### 3.1. Hypothesis development

The hypotheses to be tested result from both anecdotal evidence on the influence of goodwill, and the findings of Higson (1990) and Salami and Sudarsanam (1996) that goodwill write-offs influence the choice of financing method in acquisitions. If accounting considerations are relevant to the choice of consideration offered, it would be expected that goodwill write-off problems increase the probability of an equity offer:

**H1:** *Acquirers facing large goodwill write-offs will be more likely to finance acquisitions with equity rather than cash.*

As in Salami and Sudarsanam (1996), goodwill is proxied by taking the bid value minus the target's net assets. Higson (1990) and Salami and Sudarsanam (1996) divide goodwill by the acquirer's net assets.[10] The relevant reserves normally available for goodwill write-off are the revenue reserves, but in forming a proxy variable for the ability of a bidder to write-off goodwill, one problem which arises is that of acquirers with negative reserves. The implication of this is that dividing goodwill by reserves would result in a variable that is not continuous through zero, although this is easily solved by simply dividing reserves by goodwill[11] to give the variable *GWIL*. Thus increasing values of *GWIL* represent cases with declining levels of difficulty in writing off goodwill. Where goodwill is negative (17 cases), *GWIL* is set to zero and a dummy variable, *NEGGWIL*, is equal to one. Thus the hypothesised sign on both *GWIL* and *NEGGWIL* is negative.

A problem can arise with the interpretation of results that show proxies for goodwill write-off to be significantly associated with financing choice. Given that reserves are being divided by goodwill paid, the goodwill write-off proxy, *GWIL*, will tend to be negatively correlated with the size of the acquirer relative to that of the target. Furthermore, given that goodwill is a function of the premium paid for the target, the goodwill write-off problem may simply be reflecting the degree of any over-payment for the target. If managements are more likely to use equity financing when they suspect they are paying too much for the target, then it is not sufficient to show that *GWIL* is significantly associated with the form of consideration given. Higson (1998: 143) shows that goodwill to acquirer's net worth can be decomposed into three elements: goodwill (G) to value of the target (VT); value of target to value of acquirer (VA); and the value of the acquirer to the acquirer's net worth (ANW).

$$G/ANW = G/VT \times VT/VA \times VA/ANW \quad (1)$$

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[9] However, the recent finding of substantial under-performance of seasoned equity offerings by Loughran and Ritter (1995) raises the alternative possibility that over-valued firms raise equity.

[10] Salami and Sudarsanam (1996, Table 2) actually use two different goodwill variables for differing aspects of their analysis. The definition here refers to their variable *GWILL*.

[11] Salami and Sudarsanam (1996) use this approach later in their analysis, but only when investigating whether goodwill is written off to a merger or revenue reserve.

Taking the inverse of Higson's expression (1) (Higson 1998: 143) and replacing acquirer's net worth with acquirer's revenue reserves (RES) so that the term on the left hand side is *GWIL*, we have:

$$\text{GWIL} = \text{RES/G} = \text{VT/G} \times \text{VA/VT} \times \text{RES/VA} \quad (2)$$

Replacing VT in the first term of the RHS of (2) with target net assets (TNA) multiplied by the target's market-to-book ratio (MBT), and VA in the third term of the RHS of (2) with acquirer's net assets (ANA) multiplied by the acquirer's market-to-book ratio (MBA) and re-arranging, we have:

$$\text{GWIL} = \text{RES/G} = \text{TNA/G} \times \text{VA/VT} \times \text{RES/ANA} \times \text{MBT/MBA} \quad (3)$$

As a linear relationship between these variables is necessary to run any regression, a logarithmic transformation is used on the data, where *TASSGWIL* is the natural logarithm of TNA/G, *VAVT* is the log of (VA/VT), *RESASS* is the log of (RES/ANA) and *COMPQ* is the log of MBT/MBA:

$$LNGWIL = TASSGWIL + VAVT + RESASS + COMPQ \quad (4)$$

If goodwill write-off really is influencing financing, as opposed to the result being driven merely by relative values, then any regression run using these terms as RHS variables should result in *RESASS* and possibly *TASSGWIL* being significant.[12]. If only *VAVT* and *COMPQ* is significant, then the conclusion is that any apparent significance of goodwill write-off is merely a manifestation of *GWIL* being a proxy for relative value, or risk-sharing (Martin, 1996).[13] This gives rise to the second hypothesis:

**H2:** *Acquirers will be more likely to finance acquisitions with equity rather than cash when: goodwill is a higher portion of target assets (TASSGWIL is lower) and/or: reserves are a lower portion of acquirer's net assets (RESASS is lower).*

Lastly, following anecdotal and reported claims on the importance of relative PE ratios (Cooke, 1986: 135), earnings dilution concerns might be expected to increase the probability of a cash offer. Thus we have a further hypothesis:

**H3:** *Acquirers will be more likely to finance acquisitions with equity rather than cash when no earnings dilution is involved.*

The extent of any earnings dilution is taken into account by dividing the PE multiple of the acquirer by the PE multiple paid for the target, as implied by the bid price. The target's PE figures are taken from *AMDATA*, whilst that of the bidder is the PE ratio from *Datastream* for the month end previous to the bid announcement. This relative ratio of the PE ratios, *RELPER*, has a positive hypothesised sign (increasing values implying declining dilution of earnings).

Having set out the main accounting hypotheses to be tested, it is necessary to control for other factors shown to have influenced the form of acquisition consideration in other studies. Martin (1996) notes that the Myers (1977) analysis suggests that managers base target debt ratios on existing assets rather than investment opportunities. This leads to the hypothesis that firms with a greater proportion of their market value represented by growth opportunities will be more inclined to raise finance through equity than debt. Further weight is lent to this hypothesis by the arguments of Jung, Kim and Stulz (1995), who claim that equity financing will be preferred by firms with good growth prospects (because equity offers greater discretion), while debt will be preferred by firms with poor opportunities (because discipline over the wasteful investment of free cash flows is forced on management).

Martin (1996) draws on these models to develop the hypothesis that acquirers with superior growth opportunities will be more likely to finance acquisitions with equity rather than cash. Martin (1996) measures growth opportunities using sales growth over the previous five years, the performance (CAR) of the firm in the year before the bid, and the market-to-book ratio as a proxy for Tobin's $q$. One problem with both of these measures used to proxy growth opportunities is that they are capable of two interpretations. In an efficient markets context, the interpretation is as assumed by Martin (1996). However, given the evidence on post-merger performance is inconsistent with market efficiency, in the context of work by Lakonishok, Schleifer and Vishny (1994), these parameters could serve to identify over-valued 'glamour' stocks.

Thus, if the two variables proxying for growth opportunities were significant, an alternative interpretation of the results is that over-valued acquirers use equity financing to take advantage of market mis-pricing. Pre-bid abnormal returns and the acquirer's $q$ ratio will only be reliable indicators of growth opportunities if prices represent the present value of future cash flows plus the value of any embedded real options. Nonetheless, an estimate of $q$ is made here. This is made using an approach similar to that employed in some of the 'shareholder value' models that estimate a cash flow rate of return on inflation-adjusted assets (Madden, 1996). This approximation of Tobin's $q$ is derived by adjusting the non-property assets of the acquirer for the effects of estimated inflation. This estimation is arrived at by dividing the accumulated depreciation on these assets in the financial year ended at least three months before the bid by the depreciation provided in the year to give a proxy for the average age of the assets. The non-property net book value of the assets is then multiplied by one plus the average inflation rate during the period of the study compounded by the estimated average age of the assets. This estimate is the variable *BIDQ*.[14]

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[12] If only *TASSGWIL* was significant, it could be argued that if high goodwill was a proxy for over-payment, a significant association between the variable and the propensity to issue equity was merely evidence that acquirers finance with equity if they believe they may be over-paying.

[13] Martin (1996) uses the relative $q$ ratios of bidder and target as a further proxy for risk-sharing. Relative $q$ is approximated by relative market-to-book ratios here.

An alternative measure of profitable growth opportunities is the return on capital employed (ROCE). Although a far from perfect measure, and one which has been used as a proxy for alternative characteristics in other studies, accounting rate of return has assumed more prominence recently because of its association with the economic-profit-based 'shareholder value' models (Basically developments of the Peasnell (1982) model).[15] For that reason, the three year average ROCE, *ROCE*, is used as an alternative proxy for profitable growth opportunities in this paper.[16]

Higson (1990) shows that pre-bid returns can influence the form of payment. Two interpretations of this are possible. One is the proxy for growth opportunities employed by Martin (1996). The other is a simple over-valuation explanation. In either case, the expectation is that pre-bid performance will be positively associated with the propensity to use equity financing. Given the problems with the CAR methodology noted in the recent literature (Kothari and Warner, 1997; Lyon et al., 1999), an adjusted Jensen alpha measure is used as the estimate of pre-bid returns here. Two alternative models for the return-generated process are employed; one a CAPM extended for size effects using the Hoare-Govett index of smaller company returns, and the second the Fama-French 'three factor' model. These adjusted Jensen alphas are denoted *HGPREA* and *FFPREA* respectively, and they are estimated by running regressions for the 36 months ending six months prior to bid announcement.[17]

Other control variables used here reflect the risk sharing, pecking order, free cash flow, cash availability, economic cycle and bid hostility hypotheses developed in Martin (1996), which draws on research by Hansen (1987), Myers (1984), Jensen (1986) and Choe, Masulis and Nanda (1993). To reflect risk sharing, the measures used in this study for absolute and relative value are the log of the value of the bid (*LOGBID*) recorded by *AMDATA*, and *RVALUE*, the value of the target divided by the value of the acquirer plus the value of the target. In the context of risk sharing, Gregory (1997) notes that there is some weak evidence to suggest that experienced bidders (that is bidders who have undertaken more than one acquisition during the 1984–92 period) may perform better than inexperienced bidders, post takeover. Given that experienced bidders may face reduced risks from over-valuation, they may have less need to share risks by undertaking equity offers. This is tested by including the dummy variable *BIDEXP*, the expected sign on the coefficient being negative. In addition, information asymmetry may be greater in the case of a conglomerate bid.[18] This is controlled for by including a dummy variable, *CONG*, for conglomerate bids (defined as being bids where the two-digit SIC code of bidder and target differ).

Cash availability is proxied by the amount of cash and marketable securities on the balance sheet of the acquirer, divided by the amount paid for the target (*CASHVAL*). In addition to the *CASHVAL* variable, the acquirer's average gearing ratio over the past three years is measured by the ratio of debt to capital employed (*GEAR*).[19,20] While cash relative to the price of the target is likely to influence the form of financing, the free cash flow hypothesis of Jensen (1986) also suggests that absolute levels of cash may be important, so the percentage of cash and marketable securities to total assets is used as a further control variable (*CASH%*).

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[14] Results are not materially affected if the market-to-book ratio is used instead of *BIDQ*.

[15] In some economic profit models, accounting adjustments are made in calculating the asset base. An alternative measure of rate of return was constructed by using asset values at an approximated replacement cost (see above), but as the results were not significantly different from those obtained by using ROCE, they are not reported here.

[16] The results are not sensitive to the use of latest ROCE rather than the three-year average.

[17] As an alternative, using the standardised CAR of the acquirer leads to lower significance of the returns-based variables in the logit regressions, but the significance of all other variables is not materially affected. Explanatory power (as measured by the Maddala R-squared) is slightly higher when the alpha measures are used.

[18] I am grateful to an anonymous referee for this suggestion.

[19] Using capital employed rather than market capitalisation of equity as the denominator is consistent with the formulation of the test of the investment opportunities hypothesis, where it was argued that managers will be inclined to base target gearing ratios on assets owned rather than growth opportunities (Myers, 1977). As Martin (1996) notes, Smith and Watts (1992) provide empirical support for this.

[20] Martin uses the gearing ratio relative to an industry average.

The change in the FTASI for the 12 months prior to the bid (*DMKT*) is employed as the first business cycle variable. It might be expected that in times when the economic outlook, as proxied by this variable, is favourable and in times when the term structure premium (*LONGSHT*) is high, firms will be more likely to finance bids with equity rather than with cash. It also seems likely that the level of real interest rates in the economy will have some bearing upon the choice of financing method, and so a proxy for real interest rates is incorporated (*REALTBR*), this being the three-month Treasury Bill Rate deflated by the 12-month inflation (RPI) rate. Two direct measures of economic activity are used. The first, similar to Martin (1996), is the 12-month change in the UK Long Leading Indicator (published by the Central Statistical Office), *CUKLEAD*. The second is the change in the previous quarter's GDP (*CGDP*).

Martin (1996) describes the conditions that make hostile takeovers difficult to finance via the medium of equity; as noted above, these problems do not affect hostile offerings in the UK. Nonetheless, as Martin notes, cash bids may in some ways be interpreted as more credible, partly because there is less uncertainty about the value of the offer to target shareholders. This is controlled for by using a dummy variable, *HOSTILE*, set equal to one if *AMDATA* classifies the bid as hostile.

Martin (1996) also investigates whether corporate governance variables might influence the form of payment. He argues that directors' shareholding may have a non-linear effect, with moderate holdings increasing the propensity to use cash, but high or low holdings leading to a position where directors are likely to be unconcerned about dilution of control (p. 1,231). Martin (1996: 1,239) therefore uses a spline variable for directors' control, with the first group being holdings in the range 0–5%, the second being 5% to 25% and the last being holdings greater than 25%. As the *Stock Exchange Yearbook* only reports shareholdings greater than 5% for most of the sample period, in this analysis it is only possible to observe holdings of 5% or greater[21] and so the directors' control variable is limited to a two-spline segmentation. Assuming *OFFDIR* represents the percentage directors' shareholding in the acquiring firm, following Martin (1996) the variables are: $OFFDIR5 = 0$ if $OFFDIR < 5\%$; $OFFDIR5 = OFFDIR - 5$ if $5 < \%OFFDIR < 25\%$; $OFFDIR5 = 20$ if $OFFDIR \geq 25\%$; $OFFDIR25 = 0$ if $OFFDIR < 25\%$; and $OFFDIR25 = OFFDIR - 25\%$ if $OFFDIR \geq 25\%$. Again following Martin, institutional and non-institutional shareholdings are included as corporate governance variables. These variables, *INSTH* and *NONINSTH*, are also from the *Stock Exchange Yearbook* and are the actual shareholdings in excess of 5%.

Last, it is possible that managements use equity financing because either they know their firm's shares are over-valued, or they realise that the price being paid for the target is such that the firm will under-perform in the future. To control for this, further regressions are run using the post-takeover equivalent Jensen alpha from the two returns generating models used (*HGPOSA* and *FFPOSA* respectively). If management is able to predict the over-valuation/under-performance of the firm, and this motivates their choice of financing, then this alpha value will be significant. If some form of management hubris prevails (Roll, 1986), then the expectation is that the coefficient on this variable will not be significantly different from zero.

## 4. Data and method

### *4.1. Sample*

The sample analysed is the sample of all UK take-overs of listed domestic companies by UK plcs between January 1984 and December 1992 with a bid value recorded by the AMDATA/*Acquisitions Monthly* database of £10m or more. This cut-off was chosen to lessen any problems due to noise when large acquirers take over small targets. All returns data are from the London Business School Share Price Database, except for the Hoare-Govett figures, which were obtained direct from Hoare Govett.

The recent event-study literature shows that the benchmark chosen can have an important impact on the conclusions drawn (e.g., Fama and French 1996). It also seems clear that some form of size-control is required when calculating abnormal returns. When controlling for size, there is a choice to be made between a regression model and a simple decile control or matched firms model. Similar arguments apply if market-to-book ratios are to be controlled for.[22] A regression-based model is chosen here, partly because it enables the standardised prediction error method to be used (this is the test statistic found to be superior by Graham et al. [1996]), and partly because some preliminary evidence (Cable and Holland, 1996) strongly favours regression-based models to simpler alternatives. The coefficients in the models are estimated on up to 36 months post-completion for post-takeover returns, and for months −42 to −7 pre-announcement for pre-takeover returns. In both cases, the minimum requirement is that 12 months' returns be available to calculate regression parameters. Given these data requirements, post-completion returns can be estimated for 452 acquirers, and pre-completion returns can be estimated for 436 acquirers; 426 acquirers can have both pre- and post-completion returns estimated for them.

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[21] Company accounts were not available for a large percentage of the sample, and so the *Stock Exchange Yearbook* was the only viable alternative source.

[22] For evidence on market-to-book effects in the UK, see Strong and Xu (1997).

The tests conducted required additional information to be available from *Datastream*, *AMDATA*, and the LBS returns tape. All accounting data are collected from *Datastream* (for the financial year ended at least three months prior to the bid), while all information relating directly to the bid is from *AMDATA* figures. Market capitalisations are from the LBS returns tape. For the overall test of the model described below, all of the data requirements reduce the initial sample of 426 acquisitions for which pre-acquisition returns were reported above to a final sample size of 311. Of the original sample, 72.7% were classified as equity financed, while in the reduced sample 227 are classified as equity financed (73%); the appropriate chi-squared test for differences is insignificant. Thus the data availability problems appear to affect the equity and non-equity portions of the sample equally. Summary statistics for the data are presented in Table 1.

### *4.2. Method*

The sample is analysed between equity offers (which include share offers with a cash alternative), mixed, and cash offers (including cash with a loan note alternative), based upon the AMDATA/*Acquisitions Monthly* categorisation, and differs from classifications used in Salami and Sudarsanam (1996) and Higson (1990). Higson (1990) classifies shares with a cash alternative as cash when more than 50% of holders take cash, and equity otherwise. Salami and Sudarsanam (1996) measure the actual proportions of the consideration taken as equity. Which of these approaches is more appropriate really depends upon the explanatory variable of most interest in predicting the type of offer. If, say, the dilution of accounting earnings is of most interest, then the actual proportions as used in Salami and Sudarsanam (1996) and Cooke et al. (1994) are of most concern. However, the accounting explanatory variable of primary interest in this paper is goodwill. Given that to obtain merger relief all that is necessary is that *some* equity be issued as consideration, the classification adopted here seems more appropriate. In practice, the evidence presented in Cooke et al. (1994) indicates that offers featuring a cash alternative to the equity element are taken up by less than 10% of shareholders on average.

The analysis of method of payment uses a binomial logistic regression or Logit model with a dependent variable *SHARES* set equal to one if the takeover is financed using equity. The multinomial logistic regression approach of Martin (1996) is not used here as there are too few observations in the 'mixed' category (26 cases only) to permit any meaningful analysis given the number of independent variables used. The regressions are run using the accounting and control variables described, together with the adjusted Jensen alphas. Initially, only pre-bid alphas are employed so that all the data used to estimate the regressions are available at the time of the bid. This might be viewed as being a predictive model of financing. The second stage of the analysis then tests whether the coefficients on these same independent variables are robust to the inclusion of a control for post-bid performance (*HGPOSA* or *FFPOSA*). As this post-acquisition performance measure cannot be publicly observed at the time of the bid, this second model might be termed an explanatory model. The two returns-generating models used in the analysis are the Hoare-Govett (HG) model first used in Luther and Matatko (1994) and the Fama-French three-factor model. These two models are chosen because they have been shown to give the smallest and largest CARs respectively in two recent studies of long-run performance of acquirers (Gregory, 1997) and initial public offerings (Espenlaub et al., 1999). The models estimated are:

*Model 1: Value-weighted multi-index model using the Hoare-Govett Index as the measure of smaller company performance:*

$$R_{it} - \mathrm{R}_{ft} = \hat{\alpha}_i^{hg} + \hat{\beta}_i^{hg}(R_{mt} - R_{ft}) + \hat{\gamma}_i^{hg}(R_{ht} - R_{mt}) + \varepsilon_{it}^{hg} \qquad (5)$$

where:

$R_{it}$ = return on company *i* in event month *t*

$R_{mt}$ = return on market in event month *t*

$R_{ft}$ = risk-free (treasury bill) return in event month *t*

$R_{ht}$ = the return on the Hoare-Govett Smaller Companies index in event month *t*

The Hoare-Govett Smaller Companies Index (HGSCI) is a value-weighted index of the bottom 80% of companies by market capitalisation.

Fama and French (1996) report that many efficient markets' 'anomalies' can be explained by taking into account size and book-to-market value (BMV) effects through the use of a three-factor benchmark, and abnormal returns from this model (the FF model) are given by:

*Model 2: Fama and French (1996) Value-weighted three-factor model:*

$$R_{it} - R_{ft} = \hat{\alpha}_i^{ff} + \hat{\beta}_i^{ff}(R_{mt} - R_{ft}) + \hat{\gamma}_i^{ff}(SMB) + \delta_i^{ff}(HML) + \varepsilon_{it}^{ff} \qquad (6)$$

where:

**Table 1**
**Summary statistics**

| | *Full sample (N=311)* | | *Equity sample (N=227)* | | *Non-equity (N=84)* | |
|---|---|---|---|---|---|---|
| | *Mean* | *Std. Dev.* | *Mean* | *Std. Dev.* | *Mean* | *Std. Dev.* |
| SHARES | 0.730 | 0.445 | 1.000 | 0.000 | 0.000 | 0.000 |
| FFPREA | 0.011 | 0.019 | 0.012 | 0.020 | 0.006 | 0.016 |
| HGPREA | 0.009 | 0.018 | 0.011 | 0.019 | 0.005 | 0.015 |
| FFPOSA | -0.004 | 0.021 | -0.005 | 0.021 | 0.000 | 0.019 |
| HGPOSA | -0.005 | 0.021 | -0.006 | 0.020 | -0.001 | 0.021 |
| HOSTILE | 0.215 | 0.412 | 0.211 | 0.409 | 0.226 | 0.421 |
| CONG | 0.633 | 0.483 | 0.634 | 0.483 | 0.631 | 0.485 |
| BIDQ | 2.136 | 5.897 | 2.268 | 5.570 | 1.779 | 6.723 |
| LOGBID | 17.770 | 1.277 | 17.794 | 1.246 | 17.707 | 1.363 |
| RVALUE | 0.307 | 0.231 | 0.348 | 0.230 | 0.199 | 0.197 |
| BIDEXP | 0.569 | 0.496 | 0.551 | 0.499 | 0.619 | 0.489 |
| REALTBR | 0.056 | 0.011 | 0.057 | 0.012 | 0.054 | 0.010 |
| DMKT | 0.186 | 0.165 | 0.214 | 0.149 | 0.111 | 0.181 |
| LONGSHT | -0.807 | 1.546 | -0.658 | 1.381 | -1.210 | 1.872 |
| CGDP | 0.032 | 0.020 | 0.032 | 0.021 | 0.034 | 0.019 |
| CUKLEAD | 0.002 | 0.057 | 0.007 | 0.056 | -0.012 | 0.056 |
| GEAR | 0.191 | 0.179 | 0.183 | 0.187 | 0.214 | 0.154 |
| CASHVAL | 218.460 | 1143.700 | 244.260 | 1172.000 | 148.740 | 1067.200 |
| CASH% | 0.210 | 0.256 | 0.193 | 0.227 | 0.255 | 0.319 |
| GWIL | 7.812 | 24.502 | 4.158 | 12.153 | 17.686 | 41.291 |
| NEGGWIL | 0.055 | 0.228 | 0.048 | 0.215 | 0.071 | 0.259 |
| TASSGWIL | -0.421 | 1.116 | -0.454 | 1.087 | -0.335 | 1.195 |
| VAVT | 1.164 | 1.486 | 0.861 | 1.338 | 1.983 | 1.562 |
| RESASS | -0.575 | 0.890 | -0.650 | 0.940 | -0.374 | 0.705 |
| COMPQ | 0.289 | 0.875 | 0.309 | 0.843 | 0.234 | 0.961 |
| RELPER | 2.456 | 25.098 | 1.118 | 0.891 | 6.072 | 48.295 |
| ROCE | 19.166 | 11.691 | 19.472 | 13.119 | 18.342 | 6.392 |
| PREMIUM | 0.445 | 0.353 | 0.450 | 0.375 | 0.433 | 0.286 |
| OFFDIR5 | 1.452 | 4.542 | 1.710 | 4.996 | 0.756 | 2.903 |
| OFFDIR25 | 0.596 | 3.453 | 0.746 | 3.895 | 0.189 | 1.728 |
| INSTH | 1.768 | 5.291 | 1.619 | 5.224 | 2.170 | 5.481 |
| NONINSTH | 3.317 | 10.894 | 2.965 | 9.643 | 4.268 | 13.741 |

The Table shows the mean and standard deviation of the following variables: *SHARES*, a dummy variable equal to one if the acquisition is equity financed as recorded by *AMDATA*; the equivalent of the Jensen alpha of the acquirer in the period −42 months to −7 months before the bid from either the HG or FF models (*FFPREA* and *HGPREA*) and in the period from completion to 36 months after from either model (*FFPOSA* and *HGPOSA*); *HOSTILE* a dummy variable set equal to one if *AMDATA* classifies the bid as hostile; *CONG*, a dummy variable for conglomerate bids; *BIDQ*, the estimated Tobin's *q* ratio of the acquirer in the month before the bid; *LOGBID*, the natural logarithm of the amount paid for the target; *VALUE*, the value of the target divided by the value of the acquirer plus the value of the target; *BIDEXP*, a dummy variable equal to one if the bidder has made more than one acquisition in the period 1984-92; *REALTBR*, the three-month Treasury Bill Rate deflated by the 12-month inflation (RPI) rate; *DMKT*, the change in the FTASI for the 12 months prior to the bid; *LONGSHT*, the difference between the long-term gilt rate and the Treasury Bill rate; *CGDP*, the change in the previous quarter's GDP; *CUKLEAD* the 12-month change in the UK Long leading Indicator; *GEAR*, the acquirer's average gearing ratio over the past three years; *CASHVAL*, the amount of cash and marketable securities on the balance sheet of the acquirer, divided by the amount paid; *CASH%*, the percentage of cash and marketable securities to total assets; *GWIL*, reserves divided by goodwill (where goodwill is negative *GWIL* is set to zero and a dummy variable, *NEGGWIL*, is equal to one); *TASSGWIL*, the natural logarithm of target net assets to goodwill; *VAVT*, the log of the value of the acquirer divided by the value of the target; *RESASS*, the log of the acquirer's revenue reserves divided by the net book value of the acquirer; *COMPQ*, the log of the target's market-to-book divided by the acquirer's market-to-book; *RELPER*, the PE multiple of the acquirer divided by the PE multiples paid for the target, as implied by the bid price; *ROCE*, the acquirer's three-year pre-bid average return on capital employed; *PREMIUM*, the one-month bid premium paid for the target as recorded by *AMDATA*; director's control variables, *OFFDIR5* = 0 if *OFFDIR*<5%; *OFFDIR5* = *OFFDIR*-5 if 5%<*OFFDIR5*<25%; *OFFDIR5* = 20 if *OFFDIR*<25%, and *OFFDIR25* = 0 if *OFFDIR*<25%; *OFFDIR25* = *OFFDIR* - 25% if *OFFDIR*≥25%, where *OFFDIR* represents the percentage directors' shareholding in the acquiring firm; *INSTH* percentage institutional shareholdings in excess of 5%; and *NONINSTH* percentage non-institutional shareholdings in excess of 5%.

*SMB* = the value-weighted return on small firms minus the value-weighted return on large firms

*HML* = the value-weighted return on high BMV firms minus the value-weighted return on low BMV firms

The method used to construct the SMB and HML portfolios is as described in Fama and French (1996).

Inspection of the data in Table 1 confirms the results found in the earlier studies of Limmack (1991) and Gregory (1997). On average, acquirers under-perform post-takeover, and out-perform pre-takeover (these alphas are significant at the 1% level using the cross-sectional test described in Gregory 1997). When sub-analysed into equity and non-equity bids, the equity sample show stronger out-performance pre-bid, and worse under-performance post-bid. Again, these alphas are statistically significant. However, for the cash sample, post-takeover performance is not statistically significant.

### *4.3. Results*

Joint tests of the hypotheses using logit regressions are estimated using abnormal returns derived from both FF and HG models. Initially, all regressions were estimated using the full set of control variables described above and reported in Table 1. These regressions (not reported here because of space constraints but available from the author on request) reveal that in all cases the corporate governance control variables (directors', institutional and non-institutional shareholdings) are not significant at conventional levels. In order to focus upon the main variables of interest, all regressions are re-run excluding these variables. In no case are the substantive results altered with respect to the hypothesised relationships. Where differences occur in respect of the remaining control variables, these are footnoted. The re-estimated regressions are reported in Tables 2 and 3, with the first group of results relating to the predictive model being presented in Table 2.

These Table 2 results show that the choice of FF or HG model of abnormal return seems to have little bearing on the overall results. Conventional significance levels inferred from the asymptotic t-ratios, LLR tests and overall explanatory power are similar using either model of abnormal return. Two versions are run: an initial model including *GWIL* and *RVALUE*, and then a second version which substitutes the component parts of goodwill as analysed and described previously. Two variations are run within these categories, reflecting the fact that either the FF or HG models of pre-bid Jensen alphas can be employed, giving four regressions in all.

In the initial model (Model 1), the log-likelihood ratio is highly significant for both FF and HG versions. The Maddala R-squared is slightly higher in the case of the FF model (26.1% as opposed to 25.9% in the HG model). The accounting variable *GWIL* has the hypothesised signs and is significant at the 5% level in the case of the FF and HG models in a single-tailed test (at 5.4% level in the case of the HG model in a two-tailed test). As suggested by hypothesis 1, increasing difficulty in writing off goodwill (i.e., *decreasing* values of *GWIL*, which is equal to reserves divided by goodwill) is associated with an increased propensity to use equity financing for the acquisition. *NEGGWIL* has the hypothesised sign but is not statistically significant, although this is not altogether surprising given the small number of observations (n = 17) where negative goodwill arises. *RELPER* is insignificant in both models, and anyway has a sign opposite to that expected, suggesting that earnings dilution is not an issue in the determination of consideration for the acquisition. The control variables *RVALUE*, *BIDEXP*, *DMKT*, *LONGSHT*, and *CASH%* all have the hypothesised signs and are significant at the 5% level or better in the case of a single-tailed test, with *CASHVAL* being significant at this level only in the case of the FF model, while *HOSTILE* is significant at the 5% (single-tailed) level in the case of the HG model only. Finally, *FFPREA* and *HGPREA* have the hypothesised signs and are significant at the 5% level in a one-tailed test.[23]

Thus, on the basis of model 1, the significant influences on financing appear to be goodwill write-off, high relative values, bidder experience, pre-bid abnormal returns, cash available as a percentage of assets and macro-economic variables. The significance of cash proportionate to the bid value and bid hostility appear to be dependent on the model of pre-bid abnormal returns selected.

As noted earlier, merely showing *GWIL* to be significant does not in itself show that the accounting practice of writing off goodwill to reserves influences financing choice. Breaking down revenue reserves to goodwill (Higson, 1998) addresses this issue directly, and provides evidence that it is a decreasing level of the acquirer's revenue reserves relative to its value (*RESASS*) and a decreasing value of target assets to goodwill paid (*TASSGWIL*) which are associated with the propensity to use equity financing (models FF and HG 2, columns 5-8 in Table 2) in addition to the relative value of the merging firms (*VAVT*). These coefficients are all highly significant (at the 2.5% level at least in single-tailed tests) and confirm that goodwill write-off is not acting as some sort of

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[23] In the non-parsimonious version that included corporate governance control variables, *HOSTILE* was significant at the 5% level (single-tailed test) in the case of the FF model.

**Table 2**
**Logit regressions: predictive model with dependent variable '*SHARES*'**

| *Variable* | *FF Model 1* | *t-ratios (t-distr.)* | *HG Model 1* | *t-ratios (t-distr.)* | FF Model 2 | *t-ratios (t-distr.)* | HG Model 2 | *t-ratios (t-distr.)* |
|---|---|---|---|---|---|---|---|---|
| FF/HGPREA | 18.8340 | *1.919*<br>*(0.056)* | 17.7120 | *1.715*<br>*(0.087)* | 18.7520 | *1.774*<br>*(0.077)* | 16.4320 | *1.494*<br>*(0.136)* |
| HOSTILE | -0.6568 | *-1.615*<br>*(0.107)* | -0.6963 | *-1.716*<br>*(0.087)* | -0.5812 | *-1.388*<br>*(0.166)* | -0.6156 | *-1.473*<br>*(0.142)* |
| CONG | 0.4794 | *1.451*<br>*(0.148)* | 0.4590 | *1.392*<br>*(0.165)* | 0.5251 | *1.526*<br>*(0.128)* | 0.4972 | *1.448*<br>*(0.149)* |
| BIDQ | -0.0024 | *-0.089*<br>*(0.929)* | -0.0016 | *-0.058*<br>*(0.954)* | -0.0067 | *-0.239*<br>*(0.811)* | -0.0069 | *-0.246*<br>*(0.806)* |
| LOGBID | -0.0085 | *-0.059*<br>*(0.953)* | -0.0080 | *-0.056*<br>*(0.955)* | -0.0666 | *-0.447*<br>*(0.655)* | -0.0672 | *-0.452*<br>*(0.652)* |
| RVALUE | 4.2025 | *4.230*<br>*(0.000)* | 4.1442 | *4.201*<br>*(0.000)* | | | | |
| BIDEXP | -0.7964 | *-2.245*<br>*(0.026)* | -0.7648 | *-2.171*<br>*(0.031)* | -0.6857 | *-1.876*<br>*(0.062)* | -0.6512 | *-1.794*<br>*(0.074)* |
| REALTBR | 5.0444 | *0.325*<br>*(0.746)* | 4.9370 | *0.319*<br>*(0.750)* | 6.1784 | *0.384*<br>*(0.701)* | 5.9615 | *0.372*<br>*(0.711)* |
| DMKT | 4.7400 | *4.390*<br>*(0.000)* | 4.7072 | *4.366*<br>*(0.000)* | 5.2802 | *4.617*<br>*(0.000)* | 5.2278 | *4.588*<br>*(0.000)* |
| LONGSHT | 0.2422 | *1.765*<br>*(0.079)* | 0.2422 | *1.763*<br>*(0.079)* | 0.2813 | *1.999*<br>*(0.047)* | 0.2813 | *1.998*<br>*(0.047)* |
| CGDP | -10.0770 | *-1.163*<br>*(0.246)* | -9.9257 | *-1.144*<br>*(0.254)* | -13.7170 | *-1.494*<br>*(0.136)* | -13.6200 | *-1.481*<br>*(0.140)* |
| CUKLEAD | 2.5315 | *0.639*<br>*(0.523)* | 2.5538 | *0.646*<br>*(0.519)* | 2.5956 | *0.632*<br>*(0.528)* | 2.6130 | *0.637*<br>*(0.524)* |
| GEAR | 0.2953 | *0.334*<br>*(0.738)* | 0.2339 | *0.266*<br>*(0.790)* | 0.3310 | *0.349*<br>*(0.727)* | 0.2517 | *0.267*<br>*(0.789)* |
| CASHVAL | -0.0003 | *-1.686*<br>*(0.093)* | -0.0002 | *-1.548*<br>*(0.123)* | -0.0003 | *-2.016*<br>*(0.045)* | -0.0003 | *-1.885*<br>*(0.060)* |
| CASH% | -1.1106 | *-1.777*<br>*(0.077)* | -1.1217 | *-1.789*<br>*(0.075)* | -1.1641 | *-1.742*<br>*(0.083)* | -1.1665 | *-1.735*<br>*(0.084)* |
| GWIL | -0.0208 | *-2.013*<br>*(0.045)* | -0.0201 | *-1.933*<br>*(0.054)* | | | | |
| NEGGWIL | -0.5470 | *-0.889*<br>*(0.374)* | -0.5689 | *-0.926*<br>*(0.355)* | -0.7858 | *-1.158*<br>*(0.248)* | -0.8353 | *-1.232*<br>*(0.219)* |
| TASSGWIL | | | | | -0.4546 | *-2.321*<br>*(0.021)* | -0.4667 | *-2.392*<br>*(0.017)* |
| VAVT | | | | | -0.8623 | *-5.878*<br>*(0.000)* | -0.8449 | *-5.795*<br>*(0.000)* |
| RESASS | | | | | -0.4926 | *-2.049*<br>*(0.041)* | -0.4950 | *-2.056*<br>*(0.041)* |
| COMPQ | | | | | -0.4043 | *-1.428*<br>*(0.155)* | -0.4276 | *-1.515*<br>*(0.131)* |
| RELPER | -0.0097 | *-0.531*<br>*(0.596)* | -0.0099 | *-0.546*<br>*(0.585)* | -0.0097 | *-0.491*<br>*(0.624)* | -0.0099 | *-0.505*<br>*(0.614)* |
| ROCE | 0.0226 | *1.287*<br>*(0.199)* | 0.0230 | *1.307*<br>*(0.192)* | 0.0163 | *0.848*<br>*(0.397)* | 0.0158 | *0.826*<br>*(0.410)* |
| PREMIUM | 0.0947 | *0.199*<br>*(0.843)* | 0.0845 | *0.177*<br>*(0.859)* | | | | |
| CONSTANT | -0.3263 | *-0.120*<br>*(0.905)* | -0.2755 | *-0.101*<br>*(0.919)* | 2.6643 | *0.912*<br>*(0.362)* | 2.7316 | *0.939*<br>*(0.349)* |
| LLR | 93.9053 | *(0.000)* | 93.1065 | *(0.000)* | 106.2800 | *(0.000)* | 105.3100 | *(0.000)* |
| Maddala $R^2$ | 0.2606 | | 0.2587 | | 0.2895 | | 0.2872 | |

The Table shows the results of running logistic (Logit) regressions of dependent variable *SHARES*, a dummy variable equal to one if the acquisition is equity financed as recorded by *AMDATA*, on the following independent variables: The equivalent of the Jensen alpha of the acquirer in the period −42 months to −7 months before the bid from either the HG or FF models (*FFPREA* and *HGPREA*); *HOSTILE*, a dummy variable set equal to one if *AMDATA* classifies the bid as hostile; *CONG*, a dummy variable for conglomerate bids; *BIDQ*, the estimated Tobin's *q* ratio of the acquirer in the month before the bid; *LOGBID*, the natural logarithm of the amount paid for the target; *RVALUE*, the value of the target divided by the value of the acquirer plus the value of the target; *BIDEXP*, a dummy variable equal to one if the bidder has made more than one acquisition in the period 1984-92; *REALTBR*, the three-month Treasury Bill rate deflated by the 12-month inflation (RPI) rate; *DMKT*, the change in the FTASI for the 12 months prior to the bid; *LONGSHT*, the difference between the long-term gilt rate and the Treasury Bill rate; *CGDP*, the change in the previous quarter's GDP; *CUKLEAD* the 12-month change in the UK Long Leading Indicator; *GEAR*, the acquirer's average gearing ratio over the past three years; *CASHVAL*, the amount of cash and marketable securities on the balance sheet of the acquirer, divided by the amount paid; *CASH%*, the percentage of cash and marketable securities to total assets; *GWIL*, reserves divided by goodwill (where goodwill is negative *GWIL* is set to zero and a dummy variable, *NEGGWIL*, is equal to one); *TASSGWIL*, the natural logarithm of target net assets to goodwill; *VAVT*, the log of the value of the acquirer divided by the value of the target; *RESASS*, the log of the acquirer's revenue reserves divided by the net book value of the acquirer; *COMPQ*, the log of the target's market-to-book divided by the acquirer's market-to-book; *RELPER*, the PE multiple of the acquirer divided by the PE multiples paid for the target, as implied by the bid price; *ROCE*, the acquirer's three-year pre-bid average return on capital employed; and *PREMIUM*, the one-month bid premium paid for the target as recorded by *AMDATA*.

proxy for relative size. Note also that the explanatory power of these regressions are higher than those of the model 1 versions (28.95% as opposed to 26.06% in the case of the FF model, and 28.72% as opposed to 25.87% in the case of the HG model). The ratio of market-to-book ratios (*COMPQ*) appears to have no significant influence on financing, but has a sign opposite to that predicted by Martin's (1996) risk-sharing hypothesis. *NEGGWIL* has the hypothesised sign but remains insignificant, while the earnings dilution variable *RELPER* is still insignificant with a sign opposite to that expected.

It is also the case that using this second set of regressions, the influence of pre-bid returns is of weaker significance. Although FF pre-bid alpha is significant in a single-tailed test at the 10% level, the HG alpha is not. Apart from bid hostility, which now appears insignificant at the 5% level in single-tailed tests in the case of both FF and HG models, and *CASHVAL*, which becomes significant at the 5% level under both models, the conclusions with respect to the significance of the control variables is unaltered.[24]

The final test of whether goodwill-write-off considerations influence equity financing is carried out by re-running the Table 2 logit regressions incorporating post-bid adjusted Jensen alphas as an additional control. These regressions are based upon the strong premise that management is aware of the relative over- or under-valuation of the firm's equity as measured by the FF and HG equivalent of Jensen's alpha. These results are reported in Table 3. First, note that although the signs of the coefficient on post-bid returns are negative, as would be expected if management were aware of any over-valuation at the time of the bid, in none of the regressions is the coefficient significant. The important result from these regressions is that in no case is the conclusion altered concerning the association between goodwill write-off variables and the propensity to use equity financing. In the model 1 regressions, *GWIL* is significant at the 2.5% level in a single-tailed test under the FF model of returns, and at the 3% level under the HG model. Using the goodwill break-down version of the logit regressions again reveals that *TASSGWIL* and *RESASS* are significantly associated with the financing choice. Although the significance of the latter is diminished, it has the hypothesised sign and still remains significant at the 5% level in a single-tailed test. As before, the earnings dilution variable is insignificant. The conclusions with regard to the other control variables remains largely unaltered, except for the fact that bid hostility is now never significant at the 5% level (single-tailed test), and *CASHVAL* is always significant at this level.

The conclusion from this second set of four logit regressions is that even making the strong assumption that acquiring company management can predict the extent of over-valuation of their equity, goodwill write-off considerations still appear to be associated with financing choice.

Thus, it seems that the amount of goodwill paid for the target relative to the acquirer's reserves available for write-off has an influence on financing choice, supporting Hypothesis 1. Further analysis reveals that in addition to the relative size of the target compared to the acquirer, the lower the proportion of the acquirer's net worth made up of revenue reserves, the greater the likelihood of an equity offer, and the greater the relative amount of the target's assets paid in goodwill, the greater the probability of an equity offer. Hypothesis 2 is therefore accepted. Finally, in none of the models is there any significant association between relative PE ratios and financing choice, so Hypothesis 3 is rejected.

## 5. Summary and conclusions

It appears that the major variables associated with the probability of an equity offer are those related to market timing, the relative size of the target, cash availability, bidder experience and the ability to write-off goodwill. The critical market timing variables appear to be the performance of the stock market over the 12 months prior to the bid and the difference between long and short interest rates. Strong market performance and an increasing liquidity premium on interest rates are both associated with an increased probability of an equity financed bid.

Previous research in the UK has indicated that the acquirer's ability to write-off goodwill is associated with the probability of an equity offer. This result is one which may be regarded as having policy implications. In this study, some difficulties in earlier research have been addressed. First, using variables that take into account the possible distorting effects of negative goodwill and negative bidder reserves, it is shown that goodwill write-offs have a significant impact upon the probability of an equity offer. Specifically, the less the acquirer has revenue reserves available to write-off goodwill, the greater is the probability that that acquirer will finance the acquisition using equity.

Second, further analysis has demonstrated that the impact is not due to goodwill write-off being a proxy for the relative size of the acquisition; both the size of the acquirer's revenue reserves relative to its net worth and the proportionate amount of goodwill paid for the target appear to influence the likelihood of using equity. By showing that the accounting treatment of goodwill permitted under

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[24] When corporate governance variables are included, bid hostility is just significant at the 5% level in a single-tailed test in respect of the HG model only.

**Table 3**
**Logit regressions: explanatory model with dependent variable '*SHARES*'**

| *Variable* | *FF Model 1* | *t-ratios (t-distr.)* | *HG Model 1* | *t-ratios (t-distr.)* | FF Model 2 | *t-ratios (t-distr.)* | HG Model 2 | *t-ratios (t-distr.)* |
|---|---|---|---|---|---|---|---|---|
| FF/HGPREA | 17.8190 | *1.821*<br>*(0.070)* | 17.2140 | *1.664*<br>*(0.097)* | 18.8320 | *1.788*<br>*(0.075)* | 16.7340 | *1.521*<br>*(0.129)* |
| FF/HGPOSA | -10.9780 | *-1.343*<br>*(0.180)* | -9.7252 | *-1.221*<br>*(0.223)* | -6.1953 | *-0.728*<br>*(0.467)* | -5.1820 | *-0.625*<br>*(0.532)* |
| HOSTILE | -0.5924 | *-1.439*<br>*(0.151)* | -0.6404 | *-1.560*<br>*(0.120)* | -0.5436 | *-1.290*<br>*(0.198)* | -0.5863 | *-1.395*<br>*(0.164)* |
| CONG | 0.4641 | *1.395*<br>*(0.164)* | 0.4324 | *1.303*<br>*(0.194)* | 0.4961 | *1.432*<br>*(0.153)* | 0.4663 | *1.343*<br>*(0.180)* |
| BIDQ | -0.0100 | *-0.374*<br>*(0.708)* | -0.0072 | *-0.269*<br>*(0.788)* | -0.0089 | *-0.317*<br>*(0.751)* | -0.0080 | *-0.284*<br>*(0.777)* |
| LOGBID | -0.0079 | *-0.055*<br>*(0.956)* | -0.0037 | *-0.026*<br>*(0.979)* | -0.0680 | *-0.455*<br>*(0.649)* | -0.0661 | *-0.444*<br>*(0.657)* |
| RVALUE | 4.1732 | *4.193*<br>*(0.000)* | 4.1137 | *4.159*<br>*(0.000)* | | | | |
| BIDEXP | -0.8044 | *-2.255*<br>*(0.025)* | -0.7692 | *-2.174*<br>*(0.031)* | -0.6842 | *-1.868*<br>*(0.063)* | -0.6460 | *-1.777*<br>*(0.077)* |
| REALTBR | 5.7910 | *0.370*<br>*(0.711)* | 5.2972 | *0.340*<br>*(0.734)* | 6.6723 | *0.413*<br>*(0.680)* | 6.2548 | *0.389*<br>*(0.698)* |
| DMKT | 4.9341 | *4.475*<br>*(0.000)* | 4.8836 | *4.450*<br>*(0.000)* | 5.3420 | *4.640*<br>*(0.000)* | 5.2792 | *4.610*<br>*(0.000)* |
| LONGSHT | 0.2442 | *1.776*<br>*(0.077)* | 0.2400 | *1.742*<br>*(0.083)* | 0.2841 | *2.017*<br>*(0.045)* | 0.2794 | *1.982*<br>*(0.048)* |
| CGDP | -9.7974 | *-1.126*<br>*(0.261)* | -9.1843 | *-1.052*<br>*(0.294)* | -13.7760 | *-1.495*<br>*(0.136)* | -13.3120 | *-1.441*<br>*(0.151)* |
| CUKLEAD | 2.3711 | *0.596*<br>*(0.552)* | 2.5285 | *0.638*<br>*(0.524)* | 2.5146 | *0.612*<br>*(0.541)* | 2.6421 | *0.644*<br>*(0.520)* |
| GEAR | 0.2616 | *0.296*<br>*(0.768)* | 0.2223 | *0.253*<br>*(0.800)* | 0.3238 | *0.343*<br>*(0.731)* | 0.2564 | *0.274*<br>*(0.784)* |
| CASHVAL | -0.0003 | *-1.999*<br>*(0.047)* | -0.0003 | *-1.847*<br>*(0.066)* | -0.0003 | *-2.138*<br>*(0.033)* | -0.0003 | *-1.992*<br>*(0.047)* |
| CASH% | -1.0555 | *-1.680*<br>*(0.094)* | -1.0758 | *-1.706*<br>*(0.089)* | -1.1078 | *-1.668*<br>*(0.096)* | -1.1198 | *-1.672*<br>*(0.096)* |
| GWIL | -0.0200 | *-1.969*<br>*(0.050)* | -0.0192 | *-1.878*<br>*(0.061)* | | | | |
| NEGGWIL | -0.5707 | *-0.923*<br>*(0.357)* | -0.5721 | *-0.930*<br>*(0.353)* | -0.7584 | *-1.114*<br>*(0.266)* | -0.7989 | *-1.175*<br>*(0.241)* |
| TASSGWIL | | | | | -0.4411 | *-2.241*<br>*(0.026)* | -0.4515 | *-2.297*<br>*(0.022)* |
| VAVT | | | | | -0.8531 | *-5.808*<br>*(0.000)* | -0.8367 | *-5.723*<br>*(0.000)* |
| RESASS | | | | | -0.4547 | *-1.848*<br>*(0.066)* | -0.4618 | *-1.876*<br>*(0.062)* |
| COMPQ | | | | | -0.3528 | *-1.209*<br>*(0.228)* | -0.3788 | *-1.295*<br>*(0.196)* |
| RELPER | -0.0101 | *-0.496*<br>*(0.620)* | -0.0101 | *-0.509*<br>*(0.611)* | -0.0099 | *-0.473*<br>*(0.637)* | -0.0101 | *-0.488*<br>*(0.626)* |
| ROCE | 0.0275 | *1.499*<br>*(0.135)* | 0.0271 | *1.490*<br>*(0.137)* | 0.0196 | *0.968*<br>*(0.334)* | 0.0186 | *0.928*<br>*(0.354)* |
| PREMIUM | 0.1199 | *0.249*<br>*(0.803)* | 0.0867 | *0.181*<br>*(0.857)* | | | | |
| CONSTANT | -0.5241 | *-0.190*<br>*(0.849)* | -0.5213 | *-0.190*<br>*(0.850)* | 2.5761 | *0.878*<br>*(0.381)* | 2.6017 | 0.889<br>(0.375) |
| LLR | 95.7994 | *(0.000)* | 94.6681 | *(0.000)* | 106.8200 | *(0.000)* | 105.7070 | *(0.000)* |
| Maddala $R^2$ | 0.2651 | | 0.2624 | | 0.2907 | | 0.2882 | |

The Table shows the results of running logistic (Logit) regressions of dependent variable *SHARES*, a dummy variable equal to one if the acquisition is equity financed as recorded by *AMDATA*, on the following independent variables: The equivalent of the Jensen alpha of the acquirer in the period −42 months to −7 months before the bid from either the HG or FF models (*FFPREA* and *HGPREA*); and in the period from completion to 36 months after from either model (*FFPOSA* and *GPOSA*); *HOSTILE*, a dummy variable set equal to one if *AMDATA* classifies the bid as hostile; *CONG*, a dummy variable for conglomerate bids; *BIDQ*, the estimated Tobin's *q* ratio of the acquirer in the month before the bid; *LOGBID*, the natural logarithm of the amount paid for the target; *RVALUE*, the value of the target divided by the value of the acquirer plus the value of the target; *BIDEXP*, a dummy variable equal to one if the bidder has made more than one acquisition in the period 1984-92; *REALTBR*, the three-month Treasury Bill Rate deflated by the 12-month inflation (RPI) rate; *DMKT*, the change in the FTASI for the 12 months prior to the bid; *LONGSHT*, the difference between the long-term gilt rate and the Treasury Bill rate; *CGDP*, the change in the previous quarter's GDP; *CUKLEAD*, the 12-month change in the UK Long Leading Indicator; *GEAR*, the acquirer's average gearing ratio over the past three years; *CASHVAL*, the amount of cash and marketable securities on the balance sheet of the acquirer, divided by the amount paid; *CASH%*, the percentage of cash and marketable securities to total assets; *GWIL*, reserves divided by goodwill (where goodwill is negative *GWIL* is set to zero and a dummy variable, *NEGGWIL*, is equal to one); *TASSGWIL*, the natural logarithm of target net assets to goodwill; *VAVT*, the log of the value of the acquirer divided by the value of the target; *RESASS*, the log of the acquirer's revenue reserves divided by the net book value of the acquirer; *COMPQ*, the log of the target's market-to-book divided by the acquirer's market-to-book; *RELPER*, the PE multiple of the acquirer divided by the PE multiple paid for the target, as implied by the bid price; *ROCE*, the acquirer's three-year pre-bid average return on capital employed; and *PREMIUM*, the one-month bid premium paid for the target as recorded by *AMDATA*.

the previous UK standard. SSAP22, was associated with economic consequences, the result adds weight to the theoretical arguments of Arnold et al. (1993) against allowing goodwill to be written off directly to reserves and provides a justification for the majority view prevailing on the ASB in the decision to issue FRS10.

## References

Accounting Standards Board (1997). *Financial Reporting Standard 10: Goodwill and Intangible Assets*. London: ASC.

Agrawal, A., Jaffe, J. F. and Mandelker, G. N. (1992). 'The post-merger performance of acquiring firms; a re-examination of an anomaly'. *Journal of Finance*, 47: 1605–22.

Arnold, J., Eggington, D., Kirkham, L., Macve, R. and Peasnell, K. (1993). *Goodwill and Other Intangibles*. London: Institute of Chartered Accountants in England and Wales.

Arnold, J. and Moizer, P. (1984). 'A survey of the methods used by UK investment analysts to appraise investments in ordinary shares'. *Accounting and Business Research*, 14: 195–208.

Cable, J. and Holland, K. (1996). 'Modelling normal returns in event studies: a model selection approach and pilot study'. *Aberystwyth Economic Research Papers*, No. 96–13. University of Wales, Aberystwyth.

Cooke, T. E. (1986). *Mergers and Acquisitions*. Oxford: Blackwell.

Cooke, T. E., Gregory, A. and Pearson, B. (1994). 'A UK empirical test of the Larson-Gonedes exchange ratio model'. *Accounting and Business Research*, 24: 133–147.

Davies, M., Paterson, R. and Wilson, A. (1994). *UK GAAP*, 4th ed. Basingstoke: Ernst & Young/Macmillan.

Day, J. F. S. (1986). 'The use of annual reports by UK investment analysts'. *Accounting and Business Research*, 16 (Autumn): 295–308.

Eckbo, B. E., Giammarino, R. M. and Heinkel, R. L. (1990). 'Asymmetric information and the medium of exchange in takeovers: theory and tests'. *Review of Financial Studies*, 3: 651–675.

Espenlaub, S., Gregory, A. and Tonks, I. (1999). 'Testing the robustness of long-term under-performance of UK initial public offerings'. *European Financial Management*, forthcoming.

Fama, E. F. and French, K. R. (1996). 'Multifactor explanations of asset pricing anomalies'. *Journal of Finance*, 50: 131–155.

Fishman, M. J. (1989). 'Preemptive bidding and the role of the medium of exchange in acquisitions'. *Journal of Finance*, 44: 41–57.

Franks, J., Harris, R. and Titman, S. (1991). 'The post-merger share price performance of acquiring firms'. *Journal of Financial Economics*, 29: 81–96.

Graham, A. S., Pirie, W. L. and Powell, W. A. (1996). 'Detecting abnormal returns using the market model with pre-tested data'. *Journal of Financial Research*, 19: 21–40.

Gregory, A. (1997). 'An examination of the long run performance of UK acquiring firms'. *Journal of Business Finance and Accounting*, 24: 971–1002.

Hansen, R. G. (1987). 'A theory for the choice of exchange medium in mergers and acquisitions'. *Journal of Business*, 60: 75–95.

Higson, C. (1990). *The Choice of Accounting Method in UK Mergers and Acquisitions*. London: Institute of Chartered Accountants in England and Wales.

Higson, C. (1998). 'Goodwill'. *British Accounting Review*, 30 (June): 141–158.

Higson, C. and Elliott, J. (1998). 'Post-takeover returns—the UK evidence'. *Journal of Empirical Finance*, 5: 27–46.

Jensen, M. C. (1986). 'Agency costs of free cash flow, corporate finance, and takeovers'. *American Economic Review*, 76: 323–329.

Jung, K., Kim, Y. and Stulz, R. (1995). 'Timing, investment opportunities, managerial discretion and the security issue decision'. *Journal of Financial Economics*, 42: 159–185.

Kennedy, V. A. and Limmack, R. J. (1996). 'Takeover activity, CEO turnover and the market for corporate control'. *Journal of Business Finance and Accounting*, 23: 267–286.

Kothari, S. P. and Warner, J. B. (1997). 'Measuring long-horizon security price performance'. *Journal of Financial Economics*, 43: 239–252.

Lakonishok, J., Schleifer, A. and Vishny, R. W. (1994). 'Contrarian investment, extrapolation and risk'. *Journal of Finance*, 49: 1541–78.

Limmack, R. J. (1991). 'Corporate mergers and shareholder wealth effects: 1977–1986'. *Accounting and Business Research*, 21 (Summer): 239–252.

Loughran, T. and Ritter, J. R. (1995). 'The new issues puzzle'. *Journal of Finance*, 50: 23–51.

Loughran, T. and Vijh, A. M. (1997). 'Do long-term shareholders benefit from corporate acquisitions?' *Journal of Finance*, 52: 1765–1790.

Luther, R. G. and Matatko, J. (1994). 'The performance of ethical unit trusts; choosing an appropriate benchmark'. *British Accounting Review*, 26: 77–89.

Lyon, J., Barber, B. and Tsai, C.-L. (1999). 'Improved methods for tests of long-run abnormal stock returns'. *Journal of Finance*, 54: 165–201.

Madden, B. J. (1996). 'The GFROI life cycle'. *Journal of Investing*, Summer.

Marsh, P. (1982). 'The choice between equity and debt: an empirical study'. *Journal of Finance*, 37: 121–144.

Martin, K. J. (1996). 'The method of payment in corporate acquisitions, investment opportunities, and management ownership'. *Journal of Finance*, 51: 1227–1246.

Myers, S. C. (1977). 'Determinants of corporate borrowing'. *Journal of Financial Economics*, 5: 147–175.

Myers, S. C. (1984). 'The capital structure puzzle'. *Journal of Finance*, 39: 575–592.

Myers, S. C. and Majluf, N. S. (1984). 'Corporate financing and investment decisions when firms have information that investors do not have'. *Journal of Financial Economics*, 13: 187–221.

Peasnell, K. V. (1982). 'Some formal connections between economic values and yields and accounting numbers'. *Journal of Business Finance and Accounting*, (Autumn): 261–381.

Roll, R. (1986). 'The hubris hypothesis of corporate takeovers'. *Journal of Business*, 59: 197–216.

Salami, A. and Sudarsanam, P. S. (1996). 'Interaction between financing decisions and accounting policy: the case of corporate acquisitions'. CUBS Working Paper.

Smith, C. W. Jr. and Watts, R. L. (1992). 'The investment opportunity set and corporate financing, dividend and compensation policies'. *Journal of Financial Economics*, 32: 263–292.

Smith, T. (1992) *Accounting for Growth*. London: Century.

Strong, N. and Xu, X. G. (1997). 'Explaining the cross-section of UK expected returns'. *British Accounting Review*, (March): 1–23.

Sudarsanam, P. S. (1995). *The Essence of Mergers and Acquisitions*. London: Prentice-Hall.

Sudarsanam, P. S., Holl, P. and Salami, A. (1995). 'Shareholder wealth gains in mergers: effect of synergy and ownership structure'. *Journal of Business Finance and Accounting*, 23: 673–698.

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# Timeliness of corporate financial reporting in emerging capital markets: empirical evidence from the Zimbabwe Stock Exchange

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**Abstract**—This article reports on the results of an empirical investigation of the timeliness of annual reporting by 47 non-financial companies listed on the Zimbabwe Stock Exchange. It also reports on the factors that affect timely reporting by these companies. The results of a descriptive analysis indicate that 98% of the companies in the sample reported promptly to the public (i.e., submitted their audited annual reports to the Zimbabwe Stock Exchange by the regulatory deadline). A two-stage least squares regression identified company size, profitability and company age as statistically significant explanators of the differences in the timeliness of annual reports issued by the sample companies. No evidence was found to support the monitoring costs theory argument, which suggests that highly-geared companies are timely reporters. Furthermore, the empirical data indicate that audit reporting lead time is significantly associated with the timeliness with which sample companies release their preliminary annual earnings announcement, but not with the timeliness of their audited annual reports. Plausible explanations for these findings along with the limitations of the underlying research are provided.

## 1. Introduction

Timely reporting contributes to the prompt and efficient performance of stock markets in their pricing and evaluation functions. Timely reporting helps to mitigate (or reduce the level of) insider trading, leaks and rumours in the market. As a result, most stock exchanges in the world including the Zimbabwe Stock Exchange (ZSE), demand from their listed companies prompt release of audited financial reports to the markets. While several studies have investigated the informational 'efficiency' of emerging stock markets, there is virtually no systematic analysis of both audit-related and corporate-specific factors likely to affect the timeliness of corporate financial reporting in these markets. Thus, researchers have been pre-occupied with the effect of released information on prices of securities traded on emerging markets, and not with the timeliness of the information and the factors that affect timely reporting. Research on the latter may improve our understanding of whether information released in emerging markets is timely, and the factors that account for this phenomenon. This article presents such an analysis by focusing on the experience of non-financial companies listed on the ZSE.

For several reasons, the ZSE serves as a useful context for investigating the characteristics of financial reporting in emerging capital markets. First, because some of the securities traded on the ZSE are also constituent stocks of the International Finance Corporation's *Global* and *Investible* Indices (i.e., the ZSE is a typical emerging stock market), international investors may be interested in the timely reporting profile of its listed companies. Second, the ZSE is the second oldest stock market in Africa (second to the Johannesburg Stock Exchange in South Africa), but little is known about it. Third, Zimbabwe is an important country

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in Africa in that its professional accountancy body presently serves (in conjunction with South Africa) on the board of the International Accounting Standards Committee.

Timeliness in financial reporting is a significant characteristic of accounting information. Stale information is of little use to market participants in their investment decision-making processes. Both prior analytical and empirical evidence provide strong support for this contention. Feltham (1972) demonstrated analytically that timely information affects a decision-maker's expected pay-off. Empirical studies have also shown that timely information affects the prices of securities on the market (Givoly and Palmon, 1982; Kross and Schroeder, 1984; Chambers and Penman, 1984).

The remainder of this article is arranged as follows: Section 2 describes the statutory and the institutional requirements relating to the timeliness of corporate financial reporting in Zimbabwe. Section Three provides a brief overview of the relevant literature. Section 4 focuses on the development of testable hypotheses. Section 5 describes the sample selection criteria and the statistical tests employed. The construct, timeliness of corporate reporting, and its operationalisation in this study are also discussed in this section. Section 6 reports and discusses the results of the statistical tests. Finally, Section 7 presents the conclusions and the limitations of the study.

## 2. The regulatory framework for timely reporting in Zimbabwe

To secure immediate release of information which might materially affect market activities and prices of listed securities, a general requirement of timely reporting is imposed by two regulatory sources in Zimbabwe: (i) the 1952 Companies Act (Chapter 190 of Zimbabwe Laws), and (ii) the ZSE Listing Agreement. The Companies Act requires that audited annual accounts be sent to shareholders, and all those that are entitled to attend a company's annual general meeting (AGM) at least 14 days before the date of the AGM. The Act obliges companies registered under it to hold their AGM within 26 weeks (182 days) immediately following the end of their financial year. In effect, companies in Zimbabwe are supposed to publish (i.e., send to shareholders) audited annual accounts within 24 weeks (168 days) after the close of their financial year. The directors of a company that fails to comply with these requirements are punished either by a fine, imprisonment or both.

With regard to companies listed on the ZSE, the timely reporting requirement is somewhat more stringent. As a condition for listing, companies undertake to send their audited annual accounts to their shareholders at least 21 days prior to their AGM. Further, listed companies are required to incorporate a provision to this effect in their articles of association, and to submit three copies of their accounts to the chief executive of the ZSE at least 22 days before the dates of their AGM (i.e., within 160 days after financial year-end).

## 3. Review of the relevant literature

The literature on the timeliness of corporate annual financial reporting is of two main types. The first type is concerned with the impact of timely reporting on variability of stock returns (e.g., Chambers and Penman, 1984). The second type is mainly concerned with the pattern, reporting lag, and the factors influencing timely reporting bahaviour (e.g., Dyer and McHugh, 1975). Only the literature on the latter is reviewed here because the present study belongs to that category.

Dyer and McHugh (1975) pioneered an empirical investigation into the timeliness of annual financial reporting of Australian companies. They examined the association between the reporting behaviour of 120 companies listed on the Sydney Stock Exchange in June 1971 and company size, year-end closing date, and profitability. They studied preliminary, auditors' signature, and total reporting lags over a six year period to 1971. Dyer and McHugh (1975) found that company size and year-end closing date were significantly associated with total lag. They, however, reported no statistically significant relationship between timely reporting and profitability.

Courtis (1976) extended this line of research by examining the association between four additional corporate attributes and reporting delay of New Zealand listed companies. The attributes examined were company age, number of shareholders, number of pages of annual report, and industry. Except for industry, none of the attributes examined was significantly associated with auditors' signature lag. He found that whereas companies in the fuel and energy and in the finance industries were fast reporters, those in the mining and exploration and in the service industries were slow reporters. Courtis (1976) observed that the companies in his sample took almost four and a half months beyond their financial year-end to report to shareholders. He attributed this lack of punctuality to the three months, on average, taken by New Zealand auditors to certify a client company's accounts.

Commenting on Courtis' (1976) study, Gilling (1977) argued that timely reporting depends on both management of the reporting company who prepares the accounts, and the auditors who express opinion on them. Gilling suggested that since Courtis (1976) was concerned primarily with auditing lag, it would have been more appropriate for Courtis to have examined the activities and attributes of auditors instead. Gilling (1977) investigated the association between attributes of auditors and auditing lag, and found that, on average, leading audit firms (representatives of the former Big-Eight) take 53 days to sign audit reports as against 90 days for small audit firms in New Zealand. While supporting Gilling's (1977) view that reporting lag is an outcome of the interaction between a company's management and its auditors, Davies and Whittred (1980) argued, however, that neither approach sufficiently explains the reporting behaviour of companies. They suggested that attributes of audit firms and those of client companies 'which jointly determine the duration of year-end audit...' should be examined (Davies and Whittred, 1980: 55). Accordingly, they tested three empirical indicants that capture year-end interaction between management and auditors, namely, the type of audit firm, changes in auditing firm and the presence or otherwise of extraordinary items. The results of their statistical analyses indicated that the type of audit firm and the presence of extraordinary items are related to the reporting behaviour of the sampled 100 companies listed on Australian Associated Stock Exchange as of 31 December 1972 and 31 December 1977.

Garsombke (1981) extended this research paradigm to North America by examining the relationship between company size, listing status, auditor-type, month of financial year-end, management attitude and favourableness of reported earnings, and timely reporting behaviour of 120 US companies. Using univariate analysis, Garsombke (1981) found that there was a statistically significant difference in timely reporting between companies listed on either the New York Stock Exchange or the Over-the-Counter market, and those listed on the American Stock Exchange.

The other subsequent studies on North American countries while using sophisticated research designs, found only an audit delay (see Givoly and Palmon, 1982; Ashton et al., 1987; Bamber et al., 1993 for US companies, and Ashton et al., 1989 for Canadian companies). For instance, Bamber et al. (1993) investigated the multivariate relationships between structured audit technology, corporate-specific factors, audit-related factors and timeliness of audit reports in the US. They reported that structured audit approach was significantly associated with longer audit report lag.

In a comparative study by Frost and Pownall (1994), they found that both domestic and foreign companies listed in the US are more timely reporters than their counterparts listed in the UK. Their study also provides evidence on the association between company size, and US exchange listing and the sample companies' reporting lag within each country.

Prior studies have focused primarily on developed markets with only two studies investigating timely reporting behaviour of companies listed on emerging stock markets.[1] To date, no study has systematically examined the relative effects of both company-specific and audit-related factors, as suggested by Davies and Whittred (1980), on timely reporting behaviour of companies in emerging economies. The present study contributes to the literature by providing such evidence.

## 4. Factors affecting timely reporting behaviour

Timely reporting is a function of audit-related and company-specific factors. Audit-related factors are those that are likely to impede (or help) the auditor in carrying out the audit assignment and issuing the audit report promptly. In contrast, company-specific factors are those that either enable management to produce a more timely annual report or reduce costs associated with undue delay in reporting. This study investigates some of these factors that are relevant to the socio-economic conditions in Zimbabwe, and for which data were available. The audit-related factors[2] include the presence of extraordinary and/or contingent items, the month of financial year-end and the complexity of a company's operations, and company-specific factors[3] including company size, profitability, gearing and company age. The impact of each factor on timeliness is theorised below.

### *4.1. Company size (SIZE)*

The timeliness of an annual report release is a function of the reporting company's size. Usually, large companies are timely reporters for several reasons. First, they have more resources, more accounting staff and sophisticated accounting information systems that result in more timely annual reports. Furthermore, large companies are able to install and operate modern computer-assisted devices that are fast in processing and monitoring inventories and production operations. The use of these devices results in a faster preparation of accounts and more timely annual reporting.

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[1] These studies are those conducted by Ng and Tai (1994) and Abdulla (1996). While Ng and Tai's (1994) study focused only on factors that affect audit delay in Hong Kong, Abdulla's (1996) was concerned with corporate-specific determinants of timeliness in Bahrain. The present study is more comprehensive than the two studies because it investigates both corporate-specific and audit-related factors. Also, it is the first study to examine timeliness of corporate reporting in an African country, and to use a simultaneous-equation estimation approach.

[2] For the audit-related factors, auditor-type was not included in this study because all the companies in the sample were audited by representatives of the international Big Five audit firms operating in Zimbabwe. The audit service market in Zimbabwe is concentrated and dominated by the representatives of the Big Five (Owusu-Ansah, 1998).

[3] In reality, the demarcation between company-specific factors and audit-related factors is not clear cut as suggested here. Certain company-specific factors such as company size, profitability and gearing can also be classified as audit-related factors (see Simnett et al., 1995: 3).

Second, large companies tend to have strong internal control systems with the consequence that auditors spend less time in conducting compliance and substantive tests. Audit delays are, therefore, minimised and this enables the companies to report promptly to the public. Third, large companies tend to be followed by a relatively large number of financial analysts who usually rely on timely release of annual reports to confirm and revise their expectations of companies' present and future economic prospects. Anecdotal evidence suggests that financial analysts interpret undue delay in reporting as an attempt to conceal information that may adversely affect the value of a company. Since large companies are generally followed by a relatively large number of analysts, there is an incentive for such companies to report timely to avoid speculative trading in their shares. Finally, the available empirical evidence suggests that large companies report on a more timely basis than their smaller counterparts (e.g. Dyer and McHugh, 1975; Ashton et al., 1989; Frost and Pownall, 1994). It is, therefore, hypothesised in the alternative form that:

> H1: ***Ceteris paribus,*** *reporting lead time is a decreasing function of a company's size.*

Company size is measured by the year-end total assets of each company as in prior studies (e.g., Gilling, 1977; Davies and Whittred, 1980; Simnett et al., 1995).

### *4.2 Profitability (PROFIT)*

Profitability is expected to influence a company's timely reporting behaviour. Dye and Sridhar (1995) state that companies with successful results (good news) will report more promptly than those with failing operations or that have sustained losses (bad news). This is because profitability measures a company's efficiency of operations. The performance of a company has a signalling effect on both the markets for corporate securities, and for corporate managerial skills (Manne, 1965; Fama, 1980; Watts and Zimmerman, 1986). The market for corporate managerial skills uses the performance of a company to set management's outside opportunity wage. For instance, a company with good news (positive performance) will experience a rise in the market values of both its outstanding equity shares and management. The opposite is true of a company with bad news (negative performance). It is, therefore, reasonable to expect the management of a successful company to report its good news to the public on a timely basis. In contrast, auditors take much time to audit failing (high risk) companies as a defence against any potential future litigation.

Empirical evidence is, however, mixed. For instance, Dyer and McHugh (1975) reported no association between profitability and total reporting lag in Australia. In contrast, Lawrence (1983) provided evidence that financially distressed companies in the US unduly delayed the release of their annual reports. He observed that about 47% of the companies in his sample took four or more months following their financial year-end to report publicly, and more than a fifth filed for bankruptcy before the release of their annual reports. In spite of the inconsistency of the empirical results, it is hypothesised, in the alternative form, that:

> H2: ***Ceteris paribus,*** *reporting lead time is a decreasing function of profitability.*

Profitability is measured by return on capital employed (ROCE).

### *4.3. Gearing (GEAR)*

The relationship between timely reporting and the extent to which a company's total assets is financed by fixed return capital is unclear. There are, however, two opposing views in the literature on the relationship between gearing and reporting lead time. One view holds that high-geared companies report more promptly than low-geared companies. This school of thought contends that because high-geared companies have the incentive to invest sub-optimally, debtholders typically include clauses in debt contracts to constrain the activities of management (Jensen and Meckling, 1976). One common clause is to require management to report promptly and at a certain frequency to enable debtholders to re-assess the long-term financial performance and position of companies.

Another explanation for the negative relationship between gearing and timely reporting is provided by the monitoring costs theory. This theory argues that different levels of audit quality would be demanded by different companies depending on their ownership structure. When agency costs are high, management is likely to desire a higher quality audit to add credibility to the accounts as a means to reduce monitoring costs. The credibility of accounts is enhanced by association with a reputable auditor, usually one of the Big Five audit firms (Firth and Smith, 1992). Because such audit firms are known to expend more resources (Palmrose, 1986), and use high quality staff (Chan et al., 1993) in their audit engagements, it is likely that audit delay will be minimal and this results in speedy reporting by client companies.

In contrast, the other view holds that gearing usually associates positively with timely reporting

(Carslaw and Kaplan, 1991) on two grounds. First, a high gearing ratio increases the probability of a company's failure which, in turn, increases the probability of the external auditor being sued. The auditor may have to perform more audit work, to improve his defence against any possible legal suit, which may lengthen the time of the audit assignment (Simnett et al., 1995). Second, audit of debt is relatively more time consuming than audit of equity especially if the number of the debtholders is large (Carslaw and Kaplan, 1991).

On the basis of the preceding discussion, *a priori* speculation of the direction of the relationship between gearing and timely reporting cannot be provided. Therefore, a directional expectation is not formulated for gearing which is proxied by the ratio of long-term debts to total assets. The third hypothesis is stated in the alternative form as:

> H3: ***Ceteris paribus,*** *reporting lead time of a company is a function of its gearing ratio.*

### *4.4. Extraordinary and/or contingent items (EXTRA)*

The presence of extraordinary items and/or contingent items in a company's accounts is expected to affect the timeliness of reporting to the public. By definition, extraordinary items reflect material non-recurring events that arise from business/economic activities that are not part of the company's normal operations, and thus are expected to require additional audit time. Similarly, contingent items relate to 'conditions or situations at balance sheet date, the financial effect of which is to be determined by future events which may or may not occur' (International Accounting Standards Committee, 1995:182). Because of the uncertainty involved in the estimation of the outcomes of extraordinary and contingent items, they are likely to engage the auditor in a lengthy discussion and negotiation if he/she disputes the nature, their existence, and the estimation of the amount involved. The available empirical evidence indicates that companies reporting either extra-ordinary and/or contingent items are late reporters as they require careful audit investigation (see Ng and Tai, 1994). Hence, the fourth alternative hyposthesis is stated as:

> H4: ***Ceteris paribus,*** *companies that report extraordinary and/or contingent items are more likely to release their annual reports late compared to those that do not report extraordinary and/or contingent items.*

In the regression model, a company is coded one if it reported an extraordinary and/or contingent item, and zero if otherwise.

### *4.5. Month of financial year-end (MONTH)*

It is expected that the month of the year in which a company's financial year-ends would influence its reporting lead time. If most companies in a country have their financial year-ends within a particular period of time, and because they are required by law to have their final accounts audited, there will be much demand for the services of auditors operating in that country. This may result in possible audit delay as the workload of auditors increases tremendously. To complete an audit on schedule during the 'busy audit season' may require over-stretching of resources, including the payment of overtime allowances. Because it is costly to complete an audit on schedule during the 'busy audit season', auditors have the incentive to delay the final audit. This, in turn, affects the reporting lead time of companies whose financial year-ends fall within the busy audit season. The empirical evidence on the relevance of 'busy audit season' reported in the literature is, however, mixed (see Davies and Whittred, 1980; Newton and Ashton, 1989; Carslaw and Kaplan, 1991; Simnett et al., 1995). Although the direction of the effect of the month of the financial year-end on reporting lead time is unclear, the following directional hypothesis, stated in the alternative form is tested:

> H5: ***Ceteris paribus,*** *reporting lead time of a company is an increasing function of the proximity of its financial year-end to the busy audit season in Zimbabwe.*

The most common financial year-ends for all the companies listed on the ZSE are 31 March and 31 December, so these months were considered as 'busy audit season' in Zimbabwe. All other months were treated as 'non-busy audit season.' A dummy variable, MONTH, is coded for 'busy audit season', and zero if otherwise.

### *4.6. Complexity of operations (OPERA)*

It is expected that the degree of complexity of a company's operations will influence how timely the company reports to the public. The degree of complexity of a company's operations which depends on the number and locations of its operating units (branches) and diversification of its product lines and market, is more likely to affect the time that an auditor takes to complete his/her audit assignment, and hence, the time by which the company will eventually release its financial report to the public. Thus, a positive relationship between operational complexity and audit delay is expected. This hypothesised relationship is supported by Ashton et al. (1987) who found a significant positive relationship between operational complexity of a company and audit delay. Thus, it is hypothesised in the alternative form that:

> H6: ***Ceteris paribus,*** *reporting lead time of a company is an increasing function of the complexity of its operations.*

On the basis of an analysis in Bamber et al. (1993), the complexity of a company's operations is captured by the number of different lines of business in which a sample company operates.

### 4.7. Company age (AGE)

It is proposed in this study that promptness in financial reporting by a company is influenced by its age (i.e., its development and growth). This proposition is based on the learning curve theory. In the context of this study, the theory suggests that a reduction in reporting time would occur as the number of annual reports produced is increased. As a company continues and its accountants learn more, the 'teething problems' which would cause unusual delays are minimised. As a result, an older, well-established company is likely to be more proficient in gathering, processing and releasing information when needed because of learning experience. Thus, it is hypothesised in the alternative form that:

> H7: ***Ceteris paribus,*** *reporting lead time of a company is a decreasing function of its age.*

Ideally, a company's age should be measured from the date of its incorporation, but it is not required by law or regulation in Zimbabwe to publicly report annually when a company is private. A sample company's age is, therefore, measured here from the date of its flotation on the ZSE.

## 5. Research design and methodology

### 5.1. Sample selection and data collection

A sample of 47 non-financial companies was selected from the 64 companies that were listed on the ZSE as of 31 December 1994.[4] A listed company was included in the sample if it satisfied two conditions. First, it was a non-financial company. The Zimbabwean Companies Act exempts financial companies from complying with certain reporting requirements which may unduly influence either favourably or unfavourably their reporting behaviour. This step resulted in 58 companies surviving. Second, data on a company's preliminary earnings and final reporting dates were available. Of the remaining 58 non-financial companies, eleven did not meet the requirement of data availability, and were therefore not included in the sample.

Because of the above selection procedure, the final sample is not considered as being random, but it is a good representation of the population of non-financial companies whose equities were traded on the ZSE in 1994. The data for the analyses were derived from the annual reports of the sample companies, except those on OPERA which were taken from Remo Investment Brokers (Private) Limited (1994).

### 5.2. Conceptual definition of timeliness

Conceptually, timeliness denotes a quality of: (i) 'being available at a suitable time' or (ii) 'being well-timed' (Gregory and Van Horn, 1963: 576). The key variable in timeliness is the delay in release of annual reports. Gregory and Van Horn (1963) defined delay as 'the length of time between the cut-off point (the time no transactions are accepted for inclusion in the particular report) and the distribution of reports to users.' Delay, in this study, is described as reporting lead time. Reporting lead time is defined here as the length of time a company takes after its financial year-end to release its financial information to the public.

### 5.3. Determination of reporting lead time

Following Dyer and McHugh (1975), three reporting events for each sample company were specified as: (i) audit report date, (ii) preliminary earnings announcement date, and (iii) final report date (the date on which an annual report is filed with the ZSE). A reporting lead time is the number of calendar days between a sample company's financial year-end and the day on which each of the three reporting events occurred.

An audit reporting lead time (AUDRLT) is the number of calendar days between a sample company's financial year-end and the date of its external auditors' report. The audit report dates were taken from the annual reports of each sample company and were used to compute the AUDRLT for each company.

A preliminary earnings reporting lead time (PRERLT) is the number of days between each sample company's financial year-end and the earliest date on which its earnings announcement (abridged annual accounts) was published in one of the following daily and weekly newspapers in Zimbabwe: *Business Herald, The Financial Gazette, The Sunday News, The Chronicle, The Daily*

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[4] Although this study uses 1994 data, its findings are still relevant today as there have not been any major changes in the number of companies listed on the ZSE, their auditors and audit reporting practices, and the *timely* reporting requirements in Zimbabwe between 1994 and 2000. The data were collected in May 1996 when the writer paid a study visit to the ZSE in connection with his doctoral research project.

*Gazette,* and *The Herald.*[5] Back copies of these newspapers were thoroughly examined in the library of the publisher of *The Financial Gazette* in Harare to obtain the first dates of publication of the abridged annual accounts of each sample company.

A final reporting lead time (FINRLT) is the number of calendar days between a sample company's financial year-end and the date on which its audited annual report is received by the ZSE. The dates on which the annual reports were received by the ZSE are presumed to be the dates on which they have been released to the public in this study. These dates were taken from the in-house library of the ZSE. The ZSE has a custom of writing the dates on which annual reports of listed companies are received on their front covers. The FINRLT for each company was computed from these dates. The PRERLT and FINRLT are post-audit reporting lead times (Post-AUDRLT).

### *5.4. Model specification*

To analyse the influence of each factor on the timely reporting behaviour of the companies in the sample, a simultaneous-equation regression system of two cross-sectional models was used. The two cross-sectional reporting lead time models were estimated with a *two-stage least squares* (2SLS) technique.[6] For the equation of interest, Equation [2], the same explanatory variables were used but with different dependent variables depending on which reporting lead time is being estimated (i.e., either PRERLT or FINRLT).

The use of the 2SLS technique is justified as follows. First, on *a priori* reasoning, the events of preliminary annual earnings announcement and final release of audited accounts will chronologically follow the date on which the external auditor certifies the accounts. Hence, it is reasonable to assume that both the PRERLT and FINRLT are a function of the AUDRLT. Second, the empirical evidence in Panel B of Table 1 indicates that auditors in Zimbabwe, on average, take 62 days after a client company's financial year-end to certify the latter's accounts, while it takes the client company, on average, between seven and 23 days after the auditor has certified the accounts to release its preliminary and final accounts to the public. This suggests that the time a company takes to release either its preliminary earnings or final accounts is influenced by how long it takes its auditors to certify the accounts.

Finally, based on an argument that a chronological ordering of events does not conclusively establish causality, it was statistically assessed whether Equations [1] and [2] are simultaneously determined by using Hausman's (1978) *simultaneity specification test* as suggested in Pindyck and Rubinfeld (1991: 303-305) and Gujarati (1995: 670-671). The results of the Hausman test suggest the presence of a simultaneity problem.[7] Pindyck and Rubinfeld (1991) and Gujarati (1995) have cautioned against the use of *ordinary least squares* (OLS) regression technique, if there is a problem of simultaneity because OLS estimates will be inconsistent regardless of sample size. Rather, they recommend the use of a 2SLS regression technique whose estimates will be both consistent and efficient. Hence, the following simultaneous regression models which are assumed to hold for each sample company were estimated:

$$AUDRLT = f(SIZE, PROFIT, GEAR, AGE, EXTRA, MONTH, OPERA) \qquad [1]$$

$$Post\text{-}AUDRLT = f(AUDRLT, SIZE, PROFIT, GEAR, AGE) \qquad [2]$$

As stated earlier, Post-AUDRLT is represented by either PRERLT or FINRLT, depending on which reporting lead time is being estimated.[8] Equation [1] is a function of audit-related factors and some corporate-specific factors that may affect audit reporting lead time. The audit-related factors indirectly affect PRERLT and FINRLT.

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[5] A readership survey conducted by Research International Zimbabwe (RIZ) in 1994 showed that these newspapers enjoy the highest readership rate in Zimbabwe. Using a stratified random sample of 2,500 adults aged between 16 and 60, the RIZ found that *The Herald* is the most widely read daily newspaper followed by *The Daily Gazette,* and *The Chronicle.* As far as financial newspapers were concerned, weekly readership was highest for the *Business Herald,* followed by *The Financial Gazette.* Oppong (1993) used *The Financial Gazette* as his data source for a price-earnings study on the ZSE. *The Financial Gazette* is an equivalent to the US *Wall Street Journal* and the UK *Financial Times* in Zimbabwe, except that it is published weekly.

[6] The use of the 2SLS becomes necessary in simultaneous equation models where an endogenous regressor (AUDRLT in this study) becomes stochastic, and usually correlates with the error term of the equation in which it appears as an explanatory variable (the Equation [2] in this study). As its name implies, the 2SLS is a two-stage process. In the first stage, the endogenous regressor is regressed on some exogenous variables. This regression yields estimated endogenous regressor, which by construction, should not correlate with the error term of the equation in which it appears as an explanatory variable (Equation [2]). The test to confirm whether or not an endogenous regressor correlates with an error term of a structual model is called a simultaneity test (Pindyck and Rubinfeld, 1991). In the second stage of the estimation process, the estimated endogenous regressor is incorporated in Equation [2] as an explanatory variable. In reality, however, all the equations in the system are estimated simultaneously.

[7] The null hypothesis that there is no problem of simultaneity is rejected. The $F$-statistic for the PRERLT regression model is 62.26 with $p$-value = 0.0000, while that for the SqrtFINRLT model is 29.53 with $p$-value = 0.0000.

[8] In the context of simultaneous equation models, the jointly dependent variables (AUDRLT, PRERLT and FINRLT) are called *endogenous* variables, while those that are truly non-stochastic or can be so regarded (such as AUDRLT, SIZE, PROFIT and OPERA) are called *exogenous* variables. However, because AUDRLT is both endogenous and exogenous to the system, it is called an *exogenous regressor.*

## 6. Empirical results, analyses and discussion

### 6.1. Summary statistics

Table 1 presents summary statistics of the variables used in this study. Panel A of that table presents the results of correlation and normality tests performed on the reporting lead times. A high and significant correlation exists among the three reporting lead times; suggesting that each of them can be a surrogate measure of timeliness. The mean timeliness measured by earnings announcement date is only eight days longer than that measured by auditor's report date.

The results of a Shapiro-Wilk's test indicated that the distribution for each of the reporting lead times is fairly normal except that of FINRLT. For this reason a square foot of FINRLT (SqrtFINRLT) is used in all the regreession models. Also, a normal probability plot of the data on total assets suggests that its distribution is not normal. As a result, the measure of SIZE used in all the regression models is natural log transformed (LnSIZE).

Table 2 indicates that about 98% of the sample companies submitted their audited annual reports to the ZSE by the required date in each case. An examination of the actual reporting dates indicated that these companies reported well in advance of the 160-day requirement of the ZSE. Only one company in the sample reported late, but was within the provisions of the Companies Act. Oppong (1993) also noted a similar annual reporting behaviour of the companies listed on the ZSE. He observed that preliminary annual earnings information, and in several cases, the actual annual reports, were released by the end of the third month following their financial year-end.

### 6.2. Regression analysis

Before the models were estimated, the nature and the degree of multicollinearity among the explanatory factors and AUDRLT were assessed. Panel A of Table 3 presents the correlation matrix of the empirical indicants of the factors and AUDRLT. No pairwise correlation coefficient is higher than 0.80; as suggested by Gujarati (1995) this implies that multicollinearity is not a serious problem. Also, because many simultaneous estimation techniques break down in the face of multicollinearity (see Farley and Leavitt, 1968: 366), a post-estimation variance-covariance matrix of the estimators (VCEs) of the PRERLT model is provided in Panel B of Table 3.[9] Like the results of the simple correlation procedure, the VCEs suggest that the degree of multicollinearity is not severe.

Panel A of Table 4 reports the results of the PRERLT regression model. The *F*-statistic indicates an overall satisfactory fit which is significant at the 0.01 level. The coefficients of LnSIZE, PROFIT and AGE are all statistically significant at the conventional levels[10], and have the expected signs suggested by hypotheses H1, H2 and H7 respectively. As expected, AUDRLT also influences significantly (at the 0.01 level) when a sample company announced its annual preliminary earnings. Though not significant, the positive sign on GEAR supports the school of thought that audit of debt is more time consuming than that of equity, and as such, high-geared companies are likely to be late reporters. Thus, hypothesis H3, based on the monitoring costs theory, is not supported by the data.

The results of the SqrtFINRLT regression model are presented in Panel B of Table 4. While the overall fit of the model is not statistically significant, the coefficient of LnSIZE is significant at the 0.05 level. The coefficients of AUDRLT, PROFIT and AGE have the expected signs, but are not statistically significant in explaining how timely a sample company submitted its audited annual accounts to the ZSE. Again, no evidence was found to support the monitoring costs theory as speculated in hypothesis H3.

Of the hypothesised relationships between AUDRLT and the seven exogenous variables in Equation [1], only those between AUDRLT and LnSIZE, OPERA, AGE and MONTH are supported by the data (Table 4). The coefficients of LnSIZE and OPERA are statistically significant at the 0.05 level. On the other hand, those of AGE and MONTH are significant at the 0.10 level, but the MONTH variable has a 'wrong' sign.

The reported results for Equation [2] in Table 4 were subject to several diagnostic tests. First, a Pregibon's goodness-of-link test was performed on both the PRERLT and SqrtFINRLT models.[11] The null hypothesis that these models were mis-specified, and that some other significant explan-

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[9] The VCEs of the SqrtFINRLT model (not reported) were the same as those of the PRERLT model.

[10] Some researchers may argue that the 0.10 level for the coefficients of PROFIT and AGE is too high for significance.

[11] The link test examines the fit of a hypothesised model. The test is based on the idea that if a model is properly specified; one should not find any additional significant independent variables except by chance. It involves a re-fitting of the model, but with the prediction and the prediction squared as explanatory variables. The test is based on the significance of the prediction squared. A hypothesised model is mis-specified, if the prediction squared has an explanatory power (Pregibon, 1979; Stata Corporation, 1999a: 186–190). For different estimation procedures of the link test, see Pregibon (1980).

**Table 1**
**Summary statistics of the reporting lead times and the factors investigated ($n = 47$)**

***Panel A: Pearson correlation matrix and normality test of reporting lead time***

| *Reporting lead time* | *AUDRLT* | *PRERLT* | *FINRLT* | *SqrtFINRLT* | *Shapiro-Wilk's test for normality* | |
|---|---|---|---|---|---|---|
| | | | | | *Z-statistic* | *Significance* |
| AUDRLT | 1.0000 | 0.8045** | 0.4848** | 0.6441** | −0.560 | 0.71216 |
| PRERLT | 0.8045** | 1.0000 | 0.6406** | 0.7262** | 0.728 | 0.23319 |
| FINRLT | 0.4848** | 0.6406** | 1.0000 | 0.8217** | 1.408 | 0.07957* |
| SqrtFINRLT | 0.6441** | 0.7262** | 0.8217** | 1.0000 | 0.178 | 0.42931 |

***Panel B: Proxies, predicted directions and summary statistics of variables***

| *Variable†* | *Proxy of variable* | *Direction* | *Min.* | *Max.* | *Mean* | *Std. dev.* |
|---|---|---|---|---|---|---|
| AUDRLT | No. of days since financial year-end to the date of external auditor's report | + | 17 | 115 | 61.70 | 22.09 |
| PRERLT | No. of days since financial year-end to the date of preliminary earnings announcement | ? | 25 | 147 | 69.49 | 23.56 |
| FINRLT | No. of days since financial year-end to the date of receipt of final accounts by the ZSE | ? | 34 | 176 | 85.15 | 32.98 |
| SIZE | Natural log of year-end total assets | − | 9.64 | 14.71 | 12.40 | 1.02 |
| PROFIT | Return on capital employed(%) | − | −3.45 | 22.06 | 8.27 | 5.62 |
| GEAR | Percentage of total assets financed by long-term (interest-bearing) debts | ? | 0 | 85.81 | 9.79 | 16.04 |
| EXTRA | Extraordinary and/or contingent items | + | 0 | 1 | 0.87 | 0.34 |
| MONTH | Busy and non-busy audit seasons in Zimbabwe | + | 0 | 1 | 0.53 | 0.50 |
| OPERA | Different lines of business | + | 1 | 9 | 3.08 | 1.82 |
| AGE | No. of years since listing on the ZSE | − | 1 | 49 | 26.67 | 14.11 |

† Because the explanatory variables measure different effects on reporting lead time, the estimated coefficients will not be comparable in numerical terms (Ramanathan, 1995: 165-166). To be able to compare the numerical value of one regression coefficient with that of another, the variables in the regression models were standardised, as suggested in the econometrics literature, by subtracting the sample mean from the raw score ($X_i$) and dividing the difference by the sample standard deviation as shown in the formula below:

$$(X_i - \overline{X}_i)/S_i$$

where $\bar{x}_i$ and $s_i$ denote the mean and standard deviation of the *i*th variable. According to Snee (1973) standardisation of variables has the following advantages: (i) regression coefficients are estimated within the range of the data, and are, therefore, estimated with maximum precision; (ii) computer round-off errors are minimised ; (iii) regression coefficients can be ranked in order of absolute values to determine which variables are most important; and (iv) collinearity problems among the explanatory variables are reduced.

* $p < 0.10$ (two-tailed).

** $p < 0.01$ (two-tailed).

atory variables can be found was not supported by the link test.

Second, the assumptions of constant variance, normality and independence of the residuals of the models were examined. To check for the constant variance assumption, a residual-versus-fitted plot was graphed for each model. The graphs for both models showed no discernible patterns in the data points, suggesting that the assumption of constant variance can be maintained for both models.[12]

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[12] In a well-fitted model, there should be no pattern to the

**Table 2**
**The Pattern and timeliness of annual financial reporting of the sample companies**

| *Calendar month* | *Companies with financial year ending in* | | *Companies expected to report by the end of †* | | *Companies actually reporting by the required date* | |
|---|---|---|---|---|---|---|
| | *No.* | *%* | *No.* | *%* | *No.* | *%* |
| January | 0 | 0.0 | 3 | 6.4 | 3 | 6.4 |
| February | 3 | 6.4 | 3 | 6.4 | 3 | 6.4 |
| March | 13 | 27.7 | 3 | 6.4 | 3 | 6.4 |
| April | 0 | 0.0 | 3 | 6.4 | 3 | 6.4 |
| May | 1 | 2.1 | 1 | 2.1 | 1 | 2.1 |
| June | 5 | 10.6 | 12 | 25.5 | 11 | 23.4 |
| July | 3 | 6.4 | 0 | 0.0 | 0 | 0.0 |
| August | 3 | 6.4 | 3 | 6.4 | 3 | 6.4 |
| September | 3 | 6.4 | 13 | 27.7 | 13 | 27.7 |
| October | 3 | 6.4 | 0 | 0.0 | 0 | 0.0 |
| November | 1 | 2.1 | 1 | 2.1 | 1 | 2.1 |
| December | 12 | 25.5 | 5 | 10.6 | 5 | 10.6 |
| *Total* | 47 | 100.0 | 47 | 100.0 | 46 | 97.9 |

† This is based on the 160-day reporting requirement of the Zimbabwe Stock Exchange.

**Table 3**
**Results of collinearity tests on empirical indicants of the factors investigated (n = 47)**

***Panel A: Pearson product-moment correlation matrix***

| | *LnSize* | *Profit* | *Gear* | *Extra* | *Month* | *Opera* | *Age* | *Audrlt* |
|---|---|---|---|---|---|---|---|---|
| LnSize | 1.000 | | | | | | | |
| Profit | −0.344** | 1.000 | | | | | | |
| Gear | −0.063 | 0.098 | 1.000 | | | | | |
| Extra | −0.173 | 0.017 | −0.129 | 1.000 | | | | |
| Month | −0.026 | 0.036 | −0.132 | 0.152 | 1.000 | | | |
| Opera | 0.264* | −0.217 | −0.017 | −0.195 | −0.288 | 1.000 | | |
| Age | −0.166 | −0.004 | 0.069 | −0.089 | −0.117 | 0.066 | 1.000 | |
| Audrlt | −0.167 | −0.030 | 0.053 | 0.074 | −0.290* | 0.252* | −0.110 | 1.000 |

***Panel B: Variance-covariance matrix of the estimators of the PRERLT model †***

| | *Audrlt* | *LnSize* | *Gear* | *Profit* | *Age* | *Constant* |
|---|---|---|---|---|---|---|
| Audrlt | 1.0000 | | | | | |
| LnSize | 0.4691 | 1.0000 | | | | |
| Gear | 0.1159 | 0.0715 | 1.0000 | | | |
| Profit | 0.2387 | 0.4096 | −0.0547 | 1.0000 | | |
| Age | 0.3356 | 0.3042 | −0.0219 | 0.1457 | 1.0000 | |
| Constant | 0.0009 | 0.0020 | 0.0001 | 0.0008 | 0.0006 | 1.0000 |

* $p < 0.1$ (two-tailed).

** $p < 0.05$ (two-tailed).

† The variance-covariance of the estimators of the SqrtFINRLT model (not shown here) were the same as those of the PRERLT model.

**Table 4**
**Two-stage least squares regression estimates**

***Panel A: Preliminary earnings reporting lead time (PRERLT) as dependent variable***

| *Equation* | *Obs.* | *Root MSE* | *R-squared* | *Adj. R-squared* | *F-statistic* | *Prob > F* |
|---|---|---|---|---|---|---|
| Prerlt (2) | 47 | 14.41230 | 0.6666 | 0.6259 | 5.16 | 0.0009 |
| Audrlt (1) | 47 | 0.95928 | 0.2198 | 0.0798 | 1.57 | 0.1734 |

| | *Coef.* | *Std. Err.* | *t* | *P>\|t\|†* | *[95% Conf. Interval]* | |
|---|---|---|---|---|---|---|
| Prerlt (2) | | | | | | |
| Audrlt (+) | 13.535380 | 5.313707 | 2.547 | 0.007 | 2.804135 | 24.2666300 |
| LnSize (−) | −5.934335 | 2.596755 | −2.285 | 0.014 | −11.178590 | −0.6900824 |
| Gear (?) | 2.077011 | 2.155319 | 0.964 | 0.341 | −2.275744 | 6.4297660 |
| Profit (−) | −3.321124 | 2.344615 | −1.416 | 0.082 | −8.056170 | 1.4139230 |
| Age (−) | −3.160108 | 2.297586 | −1.375 | 0.088 | −7.800178 | 1.4799620 |
| Constant | 69.479760 | 2.102249 | 33.050 | 0.000 | 65.234180 | 73.7253300 |
| Audrlt (1) | | | | | | |
| LnSize (−) | −0.2805792 | 0.1590211 | −1.764 | 0.042 | −0.6022298 | 0.0410714 |
| Gear (?) | 0.0000992 | 0.1456831 | 0.001 | 0.999 | −0.2945728 | 0.2947711 |
| Profit(−) | −0.0616844 | 0.1532362 | −0.403 | 0.344 | −0.3716338 | 0.2482651 |
| Age (−) | −0.1955024 | 0.1462686 | −1.337 | 0.094 | −0.4913586 | 0.1003539 |
| Opera (+) | 0.2723621 | 0.1567812 | 1.737 | 0.045 | −0.0447577 | 0.5894819 |
| Extra (+) | 0.1010342 | 0.1502676 | 0.672 | 0.252 | −0.2029107 | 0.4049791 |
| Month (+) †† | −0.2548859 | 0.1513131 | −1.684 | 0.050 | −0.5609456 | 0.0511737 |
| Constant | −0.0019133 | 0.1399297 | −0.014 | 0.989 | −0.2849479 | 0.2811213 |

***Panel B: Final reporting lead time (SqrtFINRLT) as dependent variable***

| *Equation* | *Obs.* | *Root MSE* | *R-squared* | *Adj. R-squared* | *F-statistic* | *Prob > F* |
|---|---|---|---|---|---|---|
| SqrtFinrlt (2) | 47 | 1.48400 | 0.2563 | 0.1656 | 1.33 | 0.2715 |
| Audrlt (1) | 47 | 0.95928 | 0.2198 | 0.0798 | 1.57 | 0.1734 |

| | *Coef.* | *Std. Err.* | *t* | *P>\|t\|†* | *[95% Conf. Interval]* | |
|---|---|---|---|---|---|---|
| SqrtFinrlt (2) | | | | | | |
| Audrlt (+) | 0.2273118 | 0.5471575 | 0.415 | 0.340 | −0.8776953 | 1.3323190 |
| LnSize (−) | −0.4934600 | 0.2673903 | −1.845 | 0.036 | −1.0334660 | 0.0465458 |
| Gear (?) | 0.0179729 | 0.2219353 | 0.081 | 0.936 | −0.4302345 | 0.4661803 |
| Profit (−) | −0.2358306 | 0.2414273 | −0.977 | 0.167 | −0.7234029 | 0.2517417 |
| Age (−) | −0.2806695 | 0.2365847 | −1.186 | 0.121 | −0.7584619 | 0.1971230 |
| Constant | 8.8304660 | 0.2164706 | 40.793 | 0.000 | 8.3932950 | 9.2676370 |
| Audrlt (1) | | | | | | |
| LnSize (−) | −0.2805792 | 0.1590211 | −1.764 | 0.085 | −0.6022298 | 0.0410714 |
| Gear (?) | 0.0000992 | 0.1456831 | 0.001 | 0.999 | −0.2945728 | 0.2947711 |
| Profit(−) | −0.0616844 | 0.1532362 | −0.403 | 0.344 | −0.3716338 | 0.2482651 |
| Age (−) | −0.1955024 | 0.1462686 | −1.337 | 0.094 | −0.4913586 | 0.1003539 |
| Opera (+) | 0.2723621 | 0.1567812 | 1.737 | 0.045 | −0.0447577 | 0.5894819 |
| Extra (+) | 0.1010342 | 0.1502676 | 0.672 | 0.252 | −0.2029107 | 0.4049791 |
| Month (+) †† | −0.2548859 | 0.1513131 | −1.684 | 0.050 | −0.5609456 | 0.5117370 |
| Constant | −0.0019133 | 0.1399297 | −0.014 | 0.989 | −0.2849479 | 0.2811213 |

† The *p*-values are for one-tailed tests except that for the GEAR variable which is for a two-tailed test because its hypothesis is specified in a non-directional manner.

†† To isolate the partial effect of each of the busy audit seasons (DEC and MAR) and that of the non-busy audit season (OTHERS), the models were re-estimated with these variables included as an additional set of explanatory variables. The results (not reported here) indicated that only the coefficient of OTHERS was significant (*t*-statistic = 1.309, *p*-value = 0.097). The MAR dummy variable was, however, dropped by the statistical software used because too many parameters were included in the models vis-à-vis the number of observations.

A Shapiro-Wilk's test for normality of the estimated residuals indicates that the normality assumption is not violated. The hypotheses that the residuals of the PRERLT and the SqrtFINRLT models are not normally distributed are rejected at the 0.05 level. However, the assumption that the residuals of the models are independent can not be maintained. The results of a non-parametric One-sample runs test of randomness suggest that the residuals are negatively serially correlated (see Geary, 1970 for relative efficiency of the runs test).[13] The *Z*-statistics (*p*-values) for the models with PRERLT and SqrtFINRLT as dependent variables are $-0.73$ (0.4600) and $-0.14$ (0.8990) respectively.

*6.3. Discussion of regression results.*

The results show a significant inverse relationship between LnSIZE and both PRERLT and SqrtFINRLT. The negative coefficient of LnSIZE signifies that larger companies are more prompt reporters than smaller companies. These results could be that because large companies in Zimbabwe are affiliated with multinational corporations, and so they tend to have access to modern technology and are able to produce their accounts on a timely basis.

Another explanation is that large companies tend to have strong, internal control systems and efficient audit committees, and as a result, auditors spend less time in conducting compliance and substantive tests. These results corroborate the conclusions in Dyer and McHugh (1975); Davies and Whittred (1980); Givoly and Palmon (1982); Frost and Pownall (1994); and Abdulla (1996).

The negative sign of the PROFIT variable in both models suggests that successful companies (those with good news) report more promptly relative to their counterparts with poor operating results (those with bad news). This result is not surprising given the tendency of stock markets to reward profitable companies more than they reward unprofitable ones. Profitable companies, therefore, have the incentive to inform the public of their superior performance by releasing their annual reports quickly. A complementary view is that because companies reporting losses are viewed relatively as risky, auditors tend to do more substantive tests to avoid any potential future legal suit. This, in turn, prolongs a client company's reporting lead time. While the negative relationship between profitability and timely reporting found in this study is consistent with the conclusions in Courtis (1976), Lawrence (1983), Whittred and Zimmer (1984) and Abdulla (1996), it contradicts those reported in Dyer and McHugh (1975) and Garsombke (1981).

The significance of the nature of the relationship between AUDRLT and PRERLT confirms Givoly and Palmon's (1992:491) assertion that the 'single most important determinant of the timeliness of the earnings announcement is the length of the audit.' This finding is also consistent with that of Simnett et al. (1995). In contrast, while the relationship between AUDRLT and SqrtFINRLT is positive, it is not statistically significant. The result, however, does not contradict nor diminish the strength of Givoly and Palmon's (1992) assertion. Rather, it suggests that there are other factors such as delay by printing houses in Zimbabwe that might be responsible for the delay in releasing the final annual report to the public.

## 7. Conclusions, limitations and implications for future research

This article reports the results of a study which examined the pattern and timeliness of financial reporting practices of 47 listed companies in Zimbabwe. The study also investigated the factors that influenced timely reporting of these companies. The descriptive analysis indicates that about 98% of the sample companies reported within the regulatory stipulated time period (i.e., 160 days after a company's financial year-end). The study also found that preliminary earnings announcement date, audit reporting date and the date on which final accounts are released are not identically the same, but correlate significantly with each other.

The results of a 2SLS regression show that timeliness in reporting by ZSE listed companies is influenced by their size (measured by total assets), profitability (measured by ROCE), age and audit reporting lead time, depending on how the dependent variable (Post-AUDRLT) of the specified model is measured. While company size, profitability, company age and audit reporting lead time affected how fast a sample company announced its preliminary earnings (PRERLT), only size influenced the timeliness by which a sample company released its final audited annual report (FINRLT). The results of a 2SLS regression with *robust* standard errors indicate that both company size and profitability are significant predictors of timely reporting in Zimbabwe, regardless of how timeliness is measured.

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estimated residuals plotted against predicted values (Stata Corporation, 1999b: 189).

[13] Because standard errors are biased when estimated residuals are serially correlated, a 2SLS regression with *robust* standard errors was run. The robust 2SLS analysis relaxes the independence assumption (Stata Corporation, 1999c: 257). The results of the robust regression (not reported here) were not significantly different from those reported in Table 4. However, for the PRERLT model, while the coefficient of GEAR became statistially significant at the 0.10 level, that of the AGE variable lost its statistical significance. And for the SqrtFINRLT model, the coefficient of PROFIT became a significant explanator of the timely reporting behaviour of the sample companies. The results of the robust regression (not reported here) for the AUDRLT model were the same as those reported in Table 4.

The above findings and conclusions are subject to a number of limitations. First, the results of this study should not be generalised to financial companies listed on the ZSE. Second, this study did not consider all relevant factors that might affect timeliness in reporting, such as the use of audit committees by sample companies, quality of their internal control systems and the effects of cross-listing, due to either lack of data on these variables in Zimbabwe or the difficulty in measuring them. These factors merit exploration in future research work on timeliness.

Third, the functional form of models examining the relationship between timeliness and its determinants warrants further investigation. It is not likely that the relationship will always be linear. Future research studies may consider non-linear models. Fourth, the size of the sample used in this study is small. Future research may extend the statistical design employed in this study to other emerging economies or developed economies where a large sample size is likely to be obtained.

Finally, this study investigates the timely reporting behaviour of ZSE listed companies at a particular point in time. Future research may examine the same sample of companies over a period of time to ascertain the trend in their timely reporting behaviour.

## References

Abdulla, J.Y.A. (1996). 'The timeliness of Bahraini annual reports', in Doupnik, T.S. and Salter, S.B. (eds.). *Advances in International Accounting,* 9: 73–88.

Ashton, R.H., Willingham, J.J., and Elliott, R.K. (1987). 'An empirical analysis of audit delay'. *Journal of Accounting Research,* 25(2), Autumn: 275–292.

Ashton, R.H., Graul, P.R. and Newton, J.D. (1989). 'Audit delay and the timeliness of corporate reporting'. *Contemporary Accounting Research,* 5(2), Spring: 657–673.

Bamber, E.M., Bamber, L.S. and Schoderbek, M.P. (1993). 'Audit structure and other determinants of audit report lag: an empirical analysis'. *Auditing: A Journal of Practice and Theory,* 12(1), Spring: 1–23.

Carslaw, C.A.P.N. and Kaplan, S.E. (1991). 'An examination of audit delay: further evidence from New Zealand'. *Accounting and Business Research,* 22(85), Winter: 21–32.

Chambers, A.E. and Penman, S.H. (1984). 'Timeliness of reporting and the stock price reaction to earnings announcements'. *Journal of Accounting Research,* 22(1), Spring: 21–47.

Chan, P., Ezzamel, M. and Gwilliam, D. (1993). 'Determinants of audit fees for quoted UK companies'. *Journal of Business Finance and Accounting,* 20(6), November: 765–786.

Courtis, J.K. (1976). 'Relationships between timeliness in corporate reporting and corporate attributes'. *Accounting and Business Research,* 6(25), Winter: 45–56.

Davies, B. and Whittred, G.P. (1980). 'The association between selected corporate attributes and timeliness in corporate reporting: further analysis'. *Abacus,* 16(1), June: 48–60.

Dye, R.A. and Sridhar, S.S. (1995). 'Industry-wide disclosure dynamics'. *Journal of Accounting Research,* 33(1), Spring: 157–174.

Dyer, J.C. and McHugh, A.J. (1975). 'The timeliness of the Australian annual report'. *Journal of Accounting Research,* 13(3), Autumn: 204–219.

Fama, E.F. (1980). 'Agency problems and the theory of the firm'. *Journal of Political Economy,* 88(2), April: 228–307.

Farley, J.U. and Leavitt, H.J. (1968). 'A model of the distribution of branded personal products in Jamaica'. *Journal of Marketing Research,* 5, November: 362–368.

Feltham, G.A. (1972). *Information Evaluation.* Studies in Accounting Research No. 5. Sarasota, Florida: American Accounting Association.

Firth M. and Smith, A. (1992). 'Selection of auditor firms by companies in the new issue market'. *Applied Economics,* 24: 247–255.

Frost, C.A. and Pownall, G. (1994). 'Accounting disclosure practices in the United States and the United Kingdom'. *Journal of Accounting Research,* 32(1), Spring: 75–102.

Garsombke, H.P. (1981). 'Timeliness of corporate financial disclosure', in Courtis, J.K. (ed.). *Communication via Annual Reports.* AFM Exploratory Series No. 11. Armidale, New South Wales: University of New England: 204–218.

Geary, R.C. (1970). 'Relative efficiency of count of sign changes for assessing residual autoregression in least squares regression'. *Biometrika,* 57(1): 123–127.

Gilling, D.M. (1977). 'Timeliness in corporate reporting: some further comment'. *Accounting and Business Research,* 8(29), Winter: 34–36.

Givoly, D. and Palmon, D. (1982). 'Timeliness of annual earnings announcements: some empirical evidence'. *Accounting Review,* 57(3), July: 486–508.

Gregory, R.H. and Van Horn, R.L. (1963). *Automatic Data-Processing Systems: Principles and Procedures,* 2nd Ed. Belmont, California: Wadsworth Publishing Company, Inc.

Gujarati, D.N. (1995). *Basic Econometrics,* 3rd Ed. London McGraw-Hill.

Hausman, J.A. (1978). 'Specification tests in econometrics'. *Econometrica,* 46(6), November: 1,251–1,271.

International Accounting Standards Committee (1995). 'International Accounting Standard IAS 10 (reformatted 1994)'. *International Accounting Standards 1995.* London: International Accounting Standards Committee: pp. 181–188.

Jensen, M.C. and Meckling, W.H. (1976). 'Theory of the firm: Managerial behaviour, agency costs and ownership structure'. *Journal of Financial Economics,* 3: 305–360.

Kross, W. and Schroeder, D.A. (1984). 'An empirical investigation of the effect of quarterly earnings announcement on stock returns'. *Journal of Accounting Research,* 22(1), Spring: 153–176.

Lawrence, E.C. (1983). 'Reporting delays for failed firms'. *Journal of Accounting Research,* 21(2), Autumn: 606–610.

Manne, H.G. (1965). 'Mergers and the market for corporate control. *Journal of Political Economics,* 73(2), April: 110–120.

Newton, J.D. and Ashton, R.H. (1989). 'The association between audit technology and audit delay'. *Auditing: A Journal of Practice and Theory,* 8 (Supplement): 22–37.

Ng, P.P.H. and Tai, B.Y.K. (1994). 'An empirical examination of the determinations of audit delay in Hong Kong'. *British Accounting Review,* 26(1), March: 43–59.

Oppong, A. (1993). 'Price-earnings research and the emerging capital markets: the case of Zimbabwe'. *International Journal of Accounting,* 28(1): 71–77.

Owusu-Ansah, S. (1998). 'The adequacy of corporate mandatory disclosure practices on emerging markets: A case study of the Zimbabwe Stock Exchange'. Unpublished Ph.D. thesis, Middlesex University, England.

Palmrose, Z.V. (1986). 'Audit fees and auditor size: Further evidence'. *Journal of Accounting Research,* 24(4), Spring: 97–110.

Pindyck, R.S. and Rubinfeld, D.L. (1991). *Econometric Models and Economic Forecasts,* 3rd Ed. New York: McGraw-Hill, Inc.

Pregibon, D. (1979). 'Data analytic methods for generalised linear models'. Unpublished Ph.D. thesis, Department of Statistics, University of Toronto, Canada.

Pregibon, D. (1980). 'Goodness of link tests for generalised linear models'. *Applied Statistics,* 29(1): 15–24.

Ramanathan, R. (1995). *Introductory Econometrics with Applications,* 3rd Ed. Orlando, Florida: Harcourt Brace and Company.

Remo Investment Brokers [Private] Limited (1994). *Investor's Guide: Introduction to the Zimbabwe Stock Exchange.* Harare: Remo Investment Brokers [Private] Limited.

Simnett, R., Aitken, M., Choo, F. and Firth, M. (1995). 'The determinant of audit delay', in Reckers, P.M.J. (ed.). *Advances in Accounting,* 13: 1–20.

Snee, R.D. (1973). 'Some aspects of nonorthogonal data analysis. Part I Developing prediction equations'. *Journal of Quality Technology,* 5(2), April: 67–79.

Stata Corporation (1999a). *Statistics: Graphics and Data Management: Stata Reference H-O.* Release 6. College Station, Texas: Stata Press.

Stata Corporation (1999b). *Statistics: Graphics and Data Management: Stata Reference P-St.* Release 6. College Station, Texas: Stata Press.

Stata Corporation (1999c). *Statistics: Graphics and Data Management: Stata User's Guide.* Release 6. College Station, Texas: Stata Press.

Watts, R.L. and Zimmerman, J.L. (1986). *Positive Accounting Theory.* Englewood Cliffs, New Jersey: Prentice-Hall.

Whittred, G. and Zimmer, I. (1984). 'Timeliness of financial reporting and financial distress'. *Accounting Review,* 59(2), April: 287–295.

# Book Reviews

**The Economics of Executive Compensation (Volumes I & II)** *Kevin F. Hallock* and *Kevin J. Murphy*. Edward Elgar, 1999. £280

*The Economics of Executive Compensation* is a collection of 45 of the most influential publications on the subject of managerial pay. The articles are collected into a single two-volume set (each volume containing about 600 pages). Professors Hallock and Murphy claim that the *Economics of Executive Compensation* is designed to serve as an overview and reference guide for graduate students, faculty, other researchers, and practitioners interested in the executive compensation literature. There is no doubt that in this collection of papers Hallock and Murphy have achieved their goal. The papers included in these two volumes are indeed the most widely cited, influential and authoritative papers on the subject. Although it is always possible to speculate that other papers could have been included, it would be difficult, I think, to argue that any of the included papers in this work should have been excluded. Overall, this excellent collection should be on the book-shelf of anyone seriously interested in the economics of executive pay literature.

The 45-paper, two-volume set is grouped into nine separate categories. Volume I covers the following material: the Theoretical Foundations of Executive Pay; Executive Compensation and Company Performance; Relative Performance Evaluation; and the Determinants of Executive Compensation. Volume I certainly covers the core issues in the executive pay literature. Volume II is more eclectic and covers the following subjects: the Effects of Executive Pay; Accounting Measures in Executive Contracts; CEO Turnover; CEO Pay Internationally; and Economic Environments and Executive Pay. These categories are useful, but as the authors note, many of the included papers do not fit neatly into one compartment and indeed can span more than one category.

The rigorous criterion for including a paper in the Hallock-Murphy collection is one of the strengths of this work. The authors compiled over 500 published articles that related to executive compensation, incentives, contracts, agency theory and the managerial labour market. To assess the importance of the papers, each was ranked according to citations and citations per year based on data from the *Social Science Citation Index* over the period 1971 to 1996. They generally included the most widely cited papers in each of their nine categories together with some newer papers that have yet to build up a sufficient citation count. In addition, they include some older but important pioneering work that they claim are 'thinly cited'!

An important feature of these volumes is the disciplinary focus of economics, finance and accounting. The authors admit that they 'have given short shrift to influential papers from organisational behaviour and sociology', and I suspect that researchers from these backgrounds may be disappointed by the focus of these volumes. In addition, current (well known) working papers and forthcoming publications were explicitly excluded from inclusion. However, all this adds-up to a well defined set of papers with an economics/accounting/finance bias which serve as an important resource for current and future research on executive pay.

To assess the contribution of this work, one should focus on where the added value lies. Importantly, the authors have collected in one place the classic research papers on executive compensation. It is difficult to do justice to all the topics that are contained in these volumes and so a flavour will have to suffice. Volume I includes key theoretical papers with a strong focus on the importance of agency theory as the foundation of executive pay research, principal-agent theory and optimal incentive contracts. The basic idea is that compensation plans are designed to align the interests of shareholders with self-interested executives. There are papers by Michael Jensen, William Meckling, Bengt Holmstrom, Sanford Grossman, Oliver Hart, Ed Lazear, Sherwin Rosen, Eugene Fama and Bob Gibbons. There is a robust treatment of the executive pay and company performance literature, especially the inclusion of the classic paper in this area by Mike Jensen and Kevin Murphy that originally appeared in the *Journal of Political Economy* in 1990. This paper established the now well-known (and much cited) result that CEO wealth changes by (only) about $3.25 for every $1,000 dollar change in shareholder wealth. Jensen and Murphy concluded that the estimated pay for performance sensitivity was 'too low' to provide meaningful managerial incentives. The relationship of pay to performance remains an important theme in compensation research.

Volume II includes papers on the effects of CEO pay. If compensation plans ameliorate the conflicts of interests between shareholders and managers, then one might conjecture that greater financial incentives may result in superior company performance. The assembled papers, on balance, provide surprisingly little direct evidence for this claim that higher pay for performance sensitivities lead to higher company performance. The papers include those by Robert Masson, John Abowd, James Brickly, Sanjai Bhagat and Ronald Lease. Volume II also contains a section on accounting measures in executive contracts which highlights the ways managers (agents) can potentially game their environment for personal advantage. Bonuses paid on accounting performance are a common feature of executive compensation contracts. Typical bonus plans will contain a floor where no bonus is payable until some target (threshold) level of performance is met. The bonus is then 'capped' at a certain higher level of performance.

The volume includes Healy's 1985 seminal article on earnings manipulation, which predicted that managers performing below the threshold or above the cap will select accounting procedures and accruals that reduce current reported earnings and boost future earnings. Healy concluded that managers do adopt income-decreasing accruals when performing below the threshold or above the bonus cap. Also, they adopt income-increasing accruals between the target threshold and the bonus cap. Included in the volume are additional papers by Rob Holthausen, Rick Lambert, Richard Sloan and David Larker which re-examine and provide further evidence on this subject.

In conclusion, this publication will be important for compensation researchers for two reasons. First, it collects in one place many important pay articles. Some have been highlighted above and there are many more in the two volumes. Second, although the literature on executive compensation is rapidly progressing, the assembled articles are standards (and many classics) which should be tackled by researchers. Professors Hallock and Murphy have, therefore, supplied a comprehensive introduction to the economics of executive compensation and in so doing have provided the stimulus for further research.

University of Warwick Martin Conyon

**Corporate Governance.** Edited by *Kevin Keasey, Steve Thompson* and *Mike Wright.* Edward Elgar Publishing Ltd, Cheltenham, 1999. xxx + 2,424pp. £490.

This edited collection of previously published work comes as a four-volume set and must surely represent one of the best attempts to date at producing the definitive review of the corporate governance literature. Containing 78 papers drawn from 37 journals (and several books) in subject areas as diverse as economics, law, finance, accounting, strategy, management, human resources, and public administration, and including a healthy mix of both US and non-US studies, it is just about as comprehensive as it is possible to get. But it is not just the breadth of coverage that singles this book out as special. More important still is the way that the editors have succeeded in adding substantial value beyond that of the constituent papers through their careful selection, organisation and presentation of such a diverse range of material. Moreover, the fact that they have not always opted for the most obvious paper on a given topic ensures that even the more widely read corporate governance enthusiasts are sure to find something new.

The four volumes are organised in such a way that they guide the reader naturally and effortlessly through the extensive and disorderly body of work that characterises the governance literature. In so doing, the editorial team has succeeded in adding much needed structure to the bewildering array of research in this area. In addition, despite the rapid pace at which the corporate governance literature is developing, the clever choice of papers and the carefully crafted unifying framework ensure that this book will remain both informative and stimulating for many years to come. A brief review of each of the four volumes is presented below.

Volume 1 (*Aspects of Corporate Governance*) is organised in three parts. Parts I and II set the scene and define the boundaries, providing a context and motivating the demand for effective corporate governance. The multi-disciplinary approach that is a hallmark of the book is apparent from the start, with these sections containing papers from the fields of economics, finance, law and management. These include several modern 'classics' such as Jensen's 1993 *Journal of Finance* paper and Hart's 1995 *Economic Journal* paper, interspersed with less high profile but equally interesting papers by Albert Hirschman, Mark Roe and Thomas Jones. As well as helping to reconcile often disparate literatures, the chapters serve to highlight the debate over exactly what the legitimate concerns of corporate governance are (or should be). The volume concludes in Part III with a series of papers examining the key issue of the interactions between governance, strategy and enterprise. The three papers in this section are empirical in nature and cover topics such as the impact of board composition and external control on R&D spending.

Volumes 2 and 3 present a systematic treatment of the primary mechanisms of corporate governance. An emerging theme throughout the two volumes is the need to view these alternative governance components not in isolation, but as part of an interrelated package of mechanisms that interact with one another to deliver an optimal solution to the governance problem. Volume 2 (*Governance Mechanisms Part I*) consists of three parts. Part I covers ownership structure and control, while Parts II and III deal with the governance roles of capital structure and institutional shareholders, respectively. Again, the choice of papers is a refreshing and balanced mix of seminal work (e.g., Berle and Means, 1933; Jensen and Meckling, 1976; Fama and Jensen, 1983) and less well-known papers. Volume 3 (*Governance Mechanisms Part II)* continues the review of the key governance mechanisms. Part I contains six papers relating to aspects of the board of directors. The treatment is again broad and, while I would have liked to have seen at least one of the papers on outside directors from the *Journal of Financial Economics)* (e.g., Weisbach, 1988) included in this section, the chosen papers work well together as a group. Part II on directors' remuneration contains all the key papers that one would hope to find, including the seminal work by Jensen and Murphy (1990, *Journal of Political Economy*). Part III contains a unique collection of papers on industrial organisation and the design of internal governance structures, which serve to raise important issues in relation to the boundaries between firms and markets. The section begins with two papers that address the fundamental question of why firms exist (Coase, 1937; Alchian and Demsetz, 1972), before moving on to examine the features of internal and industrial organisation in greater detail. The concluding section (Part IV) contains four papers on the governance of cross-national enterprises.

Given the increasing trend towards the globalisation of business and the associated control problems that arise, this section deals with extremely timely yet often overlooked issues in the governance debate. As such, it represents yet another example of the book's stimulating and original treatment of existing material. One obvious omission from the list of governance mechanisms examined in volumes 2 and 3 is the market for corporate control. Instead, the editors have chosen to deal with this subject in volume 4, possibly in recognition of the fact that its efficacy as a mechanism of managerial control still remains open to debate.

Volume 4 (*Responses to Governance Issues*) considers how governance mechanisms impact on the entrepreneurial actions of firms and comprises six chapters. Once again, the choice of subject areas and the presentation of material within these areas is both comprehensive and thought-provoking. Part I deals with the frequently overlooked aspects of financial disclosure and auditing and examines their roles in helping to deliver managerial accountability. My only criticism here is that the contracting role of accounting information might have been given a more prominent role. Parts II and III cover the market for corporate control and the governance aspects of corporate restructuring, respectively. Part IV consists of two papers dealing with issues related to the cross-ownership of enterprises, while Part V fully embraces the stakeholder perspective in its examination of employee involvement in the governance process. As one might expect, the papers in these latter two sections have a significant international flavour. Last, but by no means least, Part VI presents a collection of papers dealing with issues of governance in the public sector.

And so to the issue of cost. With a price tag of almost £500, it clearly requires a more substantial investment than the average book on corporate governance that one finds in university bookshops. Then again, of course, it is not like the average corporate governance book. As a source of reference material, it should prove extremely useful. As a way of organising one's thoughts, both for research and teaching purposes, it should prove invaluable. And as a stimulus for developing and exploring new ideas in the area of corporate governance, it will prove difficult to beat. Conclusion—good value at twice the price!

Lancaster University Steven Young

# ANNOUNCEMENT

On 25 February 2000, SOSIG (Social Science Information Gateway) officially launched its new service at a one-day event in central London. Speakers at the event included Annabel Colley, website producer for BBC's *Panorama* and chair of the Association for UK Media Librarians.

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# Volume 30 Number 4 Autumn 2000

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*Accounting and Business Research*, Vol. 30. No. 4. pp. 263–273. 2000

# The investment opportunity set and the voluntary use of outside directors: New Zealand evidence

**M. Hossain, S. F. Cahan, M. B. Adams***

**Abstract**—This study examines whether the composition of boards of directors differs between high and low growth firms. Based on prior research, we hypothesise that firms with greater investment opportunities require more monitoring because managers in these firms have more discretion both in selecting investments and allocating resources between investments. Because outside directors can be more effective monitors than inside directors, we predict that outsiders will make up a larger proportion of the board in high growth firms than in low growth firms. Using a cross-sectional sample of 77 New Zealand firms, our results suggest that the percentage of outside directors is related to growth for two of the four measures of investment opportunities which we employ. As expected, the percentage of outside directors is also related to a composite measure of investment opportunities.

## 1. Introduction

The corporate governance role played by outside directors has been a topic of considerable controversy in both the academic and professional literature (e.g., Fama and Jensen, 1983; Bhagat and Black, 1997; Shleifer and Vishny, 1997; Klein, 1998). Fama and Jensen (1983), among others, argue that independent or outside directors can efficiently and effectively control management in agency settings where ownership and management are separate. For example, Klein (1998, p. 301) reports that 'firms increasingly are replacing their inside directors with outsiders ... primarily [due] to external pressures from groups (for example, shareholder activists and the financial press) who actively advocate the perceived benefit of ... firms having boards totally independent from management.' Therefore, outside directors are valued because their interests are more closely aligned with the owners when compared to inside directors who hold positions in the firm and who may have incentives to pursue activities that do not increase firm value.[1]

Numerous studies (e.g., Byrd and Hickman, 1992; Brickley et al., 1994; Agrawal and Knoeber, 1996) examine the determinants of board composition and/or the effectiveness of outside directors.[2] However, none of these studies focus explicitly on the link between a firm's investment opportunities and the composition of its board. This is surprising, as board structure is likely to be endogenously determined and is likely to be related to the firm's growth options. For example, prior research (e.g., Smith and Watts, 1992; Gaver and Gaver, 1993; Skinner, 1993; Baber et al. 1994) find that contracting mechanisms related to capital structure, dividend policy, compensation and accounting policies are related to the firm's investment opportunity set (IOS). In other words, because there are cross-sectional differences in investment options, and different investment options imply variations in the levels and types of agency costs, firms will choose several contracting mechanisms to efficiently address these costs.

We argue that board structure is another contracting mechanism that can be used to reduce agency costs. Accordingly, we expect to find cross-sectional variation in the proportion of outside directors on the board, and this variation should be a function of the firm's IOS. Using a final sample of 77 New Zealand-based firms, we find that the

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[1] Others question the ability of outside directors to objectively monitor corporate decisions. For example, Patton and Baker (1987) point out that outside directors are usually nominated and appointed by top management, and often hold only a trivial fraction of the firm's shares.

[2] See Bhagat and Black (1997) and Shleifer and Vishny (1997) for reviews of this literature.

proportion of outside directors is positively related to two of three common measures of IOS. In addition, we find that board composition is inversely related to control variables for low inside ownership and firm size and positively related to control variables for leverage and the number of board meetings per year. In contrast, a control variable for Chief Executive Officer (CEO) tenure does not appear to be an important determinant of board composition for our sample. Overall, our results add to the literature by showing that corporate governance is another managerial policy issue that is affected by IOS.

We divide the rest of the study into five more sections. Section 2 develops our hypothesis. Section 3 provides background information on the institutional environment in New Zealand. Section 4 describes the research design, including the sources of data, the statistical model used and the measurement of the variables. Section 5 presents the results, while Section 6 summarises and concludes the paper.

## 2. Hypothesis

Myers (1977) argues that firm value consists of two main elements. These are: 1/*real* assets (called assets-in-place) which are valued independently of managers' future discretionary investment, and 2/ *real* options (assets yet to be acquired) where the value of real options depends on future discretionary investments. Examples of the latter include expansion projects, new products, business acquisitions and marketing programmes (Gaver and Gaver, 1993).

Alchian and Woodward (1988) define IOS differently than Myers (1977). They view IOS as being related to a resource's 'plasticity' and monitoring costs. They defined investments as plastic if they have 'a wide range of discretionary, legitimate decisions within which the user may choose or that an observer can less readily monitor the choice' (Alchian and Woodward, 1988, p. 69). In comparing drug and steel manufacturing firms in the United States (US), Alchian and Woodward (1988) indicate that the former had wider initial options to control decisions about resources than the latter. The activities of drug companies may also be difficult to monitor and control because of the specialised nature of their activities.

When managers have special information or specific knowledge about investment options, it can be efficient to let them choose which options to pursue (e.g., Jensen and Meckling, 1995). However, in such cases, agency costs also increase because managers may not always have incentives to maximise firm value (e.g., see Brickley et al., 1997). For example, managers may have incentives to empire-build by making diversified acquisitions that reduce firm value. Gaver and Gaver (1993, p. 129) write:

> '[A]s the proportion of firm value represented by growth opportunities (as opposed to assets in place) increases, the observability of managerial actions decreases. This is because it is difficult for outside shareholders, without the inside information and specialized knowledge of managers, to ascertain the menu of investment opportunities available to the firm.'

When the principal delegates to an agent the right to initiate and implement decisions, it is important for the principal to retain decision control authority, i.e., the right to ratify and monitor decisions (e.g., Fama and Jensen, 1983; Brickley et al., 1997). Because managers have to make and implement more investment decisions when growth options are high, we expect that monitoring would increase to counteract the increase in managerial discretion.[3] Oversight by boards of directors, particularly outside directors, is a common and generally effective form of monitoring (e.g., see Fama and Jensen, 1983).

In addition, we expect monitoring by directors, who represent shareholders' interests, to be a particularly important form of monitoring in high growth firms because these firms rely more on equity financing than low growth firms. To be specific, Myers (1977) contends that agency costs of debt will be lower when firms have more real assets than real options because assets-in-place are generally acquired for specific business purposes. This constrains managerial discretion and lowers borrowing costs. On the other hand, real options can lead to underinvestment in the presence of fixed debt because debtholders have a priority claim to the cash flows arising from positive net present value (NPV) projects (Myers, 1977). To control for underinvestment, Myers (1977) predicts that firms with more investment opportunities are likely to use equity rather than debt financing, and in their studies Smith and Watts (1992) and Gaver and Gaver (1993) find an inverse relation between IOS and debt/equity ratios.

While agency problems between shareholders and debtholders are minimised when less debt is used, in high growth firms, conflict between shareholders and managers will increase as equity financing puts fewer restrictions on management activity relative to covenant-based debt (Skinner, 1993). Because the value of high growth firms is dependent upon managers' discretionary investment decisions, absentee shareholders will put in place *ex ante* mechanisms, such as outside directors, to monitor the initiation and implementation of decisions by management. Thus, we hypothesise:

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[3] Another way to address these agency costs is to better align the managers' and shareholders' interests. For example, both Smith and Watts (1992) and Gaver and Gaver (1993) find a positive relation between IOS and the incidence of market-based incentive contracts in the US corporate sector. In New Zealand, however, market-based incentive contracts are relatively rare.

*H1 Ceteris paribus, the proportion of outside directors on the board will be positively related to the level of IOS.*

## 3. Institutional environment

An important factor which is likely to influence the relation between board composition and IOS is the institutional environment in which the corporation operates (Smith and Watts, 1992). We argue that the institutional environment in New Zealand helps to provide a clean and powerful test of the IOS hypothesis for two reasons.

First, recent changes in New Zealand's company law have clarified and codified directors' duties. For example, the Companies Act 1993, which became effective 1 July 1994, requires that directors: 1. act in good faith and in the best interests of the company; 2. exhibit care, diligence, and skill that a reasonable person would exercise; 3. avoid conflicts of interest; and 4. exercise their powers for legitimate corporate purposes.

The new Companies Act also increased directors' responsibilities regarding distributions to shareholders, repayments to creditors, and the accuracy of the company's financial statements. For example, under section 52 of the Companies Act 1993, directors are required to certify that the company will satisfy a solvency test before authorising a distribution (i.e., dividends) to shareholders. Likewise, directors now must ensure that financial statements of the reporting entity comply with applicable financial reporting standards (i.e., generally accepted accounting practice).

These changes were brought about by problems with the previous companies law, i.e., the Companies Act 1955. For example, in 1989 the Law Commission noted that 'the present [company] law relating to duties of directors is inaccessible, unclear, and extremely difficult to enforce' (quoted in Hodder, 1993, p. 38). Thus, by specifying directors' duties, the Companies Act 1993 highlights the director's monitoring role in corporate governance. In addition, because the monitoring function falls on the outside directors, the Companies Act 1993 sharpens the distinction between inside and outside directors, and this strengthens the power of our tests.

Second, unlike the US where there have been several proposals to require boards with a majority or super-majority of outside directors (see Bhagat and Black, 1997, for a review), there have been no similar proposals in New Zealand. This is important because rather than adding outside directors to reduce agency costs, US firms may also add outside directors to avoid attention from activist shareholder groups. More simply, at least some US firms may use outside directors for cosmetic reasons or as 'window-dressing'. Thus, using New Zealand data, we avoid this competing hypothesis and so provide a cleaner test of the IOS hypothesis.

## 4. Research design

### 4.1. Sample selection

The sample used in this study initially comprised 80 firms selected from the 129 companies listed on the New Zealand Stock Exchange (NZSE) as at 31 December 1995 and included in the *Share Market Review* (1995) published by the NZSE. The sample consists of firms that: 1. responded to our written request for annual reports for the year of 1995; and 2. agreed to participate in a postal questionnaire survey requesting information about the equity ownership structure, board composition and characteristics of board of directors. Ninety-four firms responded to our requests for annual reports. Of the 94 firms, 80 firms agreed to participate in the postal survey. However, this sample was reduced to 77 firms after three firms were excluded as outliers (see Section 5). Thus, our final sample covers approximately 60% of the companies listed on the NZSE in 1995.

Financial data items were extracted primarily from the published annual reports and supplemented with information obtained from Datex, a NZ financial information provider, and survey responses. While we examined early and late responses and detected no statistical differences in their responses, if non-respondents have systematically weaker corporate governance system (e.g., use less outside directors), the research findings may not be generalisable to all NZ firms. Therefore, we recognise this as a limitation of our research design.

### 4.2. Variables

Outside directors are one of several internal mechanisms (e.g., stock option plan, auditing, voluntary disclosures) that a firm could use to control agency problems and improve firm value. Because the use of outside directorships may be correlated with other internal monitoring mechanisms, as they are all driven by a common firm-specific factor—IOS (Rediker and Seth, 1995), corporate governance decisions are likely to be made simultaneously within the firm. However, Smith and Watts (1992), Gaver and Gaver (1993) and Barclay and Smith (1995) argue that allowing for interdependencies (simultaneity) among policy variables would require specification of a system of simultaneous equations. At present the IOS literature does not provide adequate insights or direction to allow us to identify the appropriate structural form of this system of equations, and we adopt the approach used in much of the prior literature, i.e., we examine a single corporate policy decision and assume IOS is pre-determined.[4]

In line with Smith and Watts (1992), Skinner (1993), Barclay and Smith (1995) and Mian (1996), we specify the board structure-IOS relation using a reduced form Ordinary Least Squares (OLS) model where the proportion of outside directors on the board is the dependent variable and IOS is an independent variable. However, because IOS is not the only determinant of board composition, we control for other determinants of board structure in our OLS model.

### *4.2.1. Dependent variable*

We define the proportion of outside directors on the board (DIR) as the number of independent outside directors on the board divided by the total number of directors on the board. Independent outside directors are board members who: 1. are not an active or retired employee of the firm, and/or 2. do not have close business ties with the firm (e.g., a consultant or supplier). While our measure distinguishes between affiliated outside directors and independent outside directors (e.g., as in Lee et al., 1992), we collect this data by a postal questionnaire rather than from annual reports or proxy statements as most US studies have done. We use postal questionnaires because disclosures about directors in New Zealand are limited and because we wanted to collect information on CEO tenure and the number of board meetings per year (see Section 4.2.3). However, we did check the reliability of the data obtained from the postal survey by comparing them with data derived from the annual reports for a sub-sample of firms. We detected no significant discrepancies.[5]

### *4.2.2. Independent variable—IOS*

IOS is measured by various proxies employed in the prior research. We use four of the most common, specifically: 1. market value of the firm to book value of assets (e.g., Smith and Watts, 1992; Barclay and Smith, 1995; Baber et al., 1996); 2. market to book value of equity (e.g., Gaver and Gaver, 1993; Lang et al., 1996) 3. price-earnings (P/E) ratio (e.g., Smith and Watts, 1992; and Gaver and Gaver, 1993); and 4. an ex-post measure, asset growth (e.g., Pilotte 1992).

The market value of the firm to book value assets, MKTBKA, is a measure of the percentage of firm value attributable to assets-in-place. This measure assumes firms with more growth options will have market values far in excess of their book values. MKTBKA is computed as the market value of assets divided by book value of assets, where market value of assets is defined as the reported value of debt plus the market value of equity. Gaver and Gaver (1993) point out that using MKTBKA induces bias for firms with long-lived assets because typically assets are measured on a historical costs basis. However, because New Zealand-based companies can revalue their non-current assets to show current costs in the financial statements, this problem is not severe in the present study. Also, MKTBKA is the growth measure used most frequently in prior studies (e.g., see Jung et al., 1996; Mian, 1996).

Another measure used in studies such as Gaver and Gaver (1993) and Barclay and Smith (1995) is the market equity to book equity ratio or MKTBKE. Because high growth firms will have more intangible assets that are not recorded but are priced by the market, MKTBKE should increase with increases in growth opportunities. MKTBKE is measured by the ratio of market value of equity to market value of assets where the market value of equity is estimated by the number of shares outstanding multiplied by share price at the calendar year end. A problem with using MKTBKE to proxy for IOS is that MKTBKE could also reflect other factors such as the ability of firms to earn monopoly rents on assets-in-place, and competition across firms (Ahmed, 1994), and the expected return on equity and risk (Penman, 1996).

The third IOS measure is the P/E ratio (e.g., Chung and Charoenwong, 1991; Gaver and Gaver, 1993). The rationale for this measure is that because a firm's share price reflects future earnings and not the current period's income the difference between current and future earnings will be more pronounced for high growth firms. As a result, high growth firms will trade at higher P/E ratios than low growth firms. However, a problem with this measure (as well as MKTBKA and MKTBKE) is that it relies on the market value of corporate shares. Because share prices decrease with increases in leverage, the market-based measures of IOS are likely to be sensitive to the firm's capital structure (Gaver and Gaver, 1993).

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[4] Titman and Wessels (1988), Jensen et al. (1992), and Agrawal and Knoeber (1996) are examples of studies that use a simultaneous equation framework. However, Smith and Watts (1992: 269) also comment that if 'the structure they use is correct, the power of their estimates is increased, but if their structure is incorrect, they impose bias. Given our current knowledge of these empirical relations, we believe progress is better served by documenting robust empirical relations between policy parameters and exogenous variables before attempting to subdivide the relations into component effects.'

[5] A copy of the questionnaire is available from the first author on request.

The fourth measure is the growth in assets or ΔASSETS. Pilotte (1992) contends that, under rational expectations, actual subsequent growth should be good proxy for anticipated investment. One problem with the *ex post* proxy is that they measure actual growth rather than the profitability on new investment.

While these are the most common IOS measures, because each has limitations, we also factor analyse to construct a composite measure of IOS.[6]

### *4.2.3. Control variables*

In testing H1, we control for other factors that may also affect board composition. For example, the degree of incentive conflicts and agency costs will be a function of managerial ownership (e.g., Jensen and Meckling, 1976; Fama and Jensen, 1983). Firms with low levels of managerial ownership will have more demand for outside directors, and prior studies (e.g., Bathala and Rao, 1995; Rediker and Seth, 1995) empirically document such a relation.

We include inside ownership (defined as a percentage of common equity owned by directors and the 'top five' managers) as a control variable. We measure inside ownership using a dummy variable. Morck et al., (1988) argue that firms that are 5–25% owned by management are likely to have lower market values. Consequently, we use a dichotomous measure INSDUM as a surrogate for inside ownership. INSDUM is coded 1 if inside ownership is less than or equal to 5% and greater than or equal to 25%, and 0 elsewhere.

Likewise, Jensen and Meckling (1976) suggest that agency conflicts between shareholders and debtholders increase with leverage. To the extent that outside directors can mitigate these conflicts, the demand for outside directors should be positively related to levels of debt. In addition, because debt imposes fixed costs on the firm and increases the possibility and costs associated with bankruptcy (Jensen and Meckling, 1976), the need for additional monitoring by outside directors will also increase. We include leverage as a control variable where leverage is defined as the book value of long term liabilities divided by total assets (LEV).

Hermalin and Weisbach (1988, 1991) suggest that long-serving CEOs have a greater influence over the selection of board members and may include directors who are likely to be closely aligned with the CEO's interests. Menon and Williams (1994) argue that the effectiveness of outside directors will increase when boards meet more frequently. This suggests that outside directors are more useful when meetings are frequent, and meeting frequency should be positively related to the proportion of outside directors. In any case, we include CEO tenure (CEOTEN) and the number of board meetings (BRDMEET) as additional controls. Both items were obtained from our postal questionnaire survey.

Firm size has been included as a control variable because prior research (e.g., Gaver and Gaver, 1993; Mehran, 1995) suggests that firm size is related to incentive control mechanisms including debt, dividends and managerial compensation. Further, Gaver and Gaver (1993) and Barclay and Smith (1995) predict that large firms have more information asymmetry between managers and outside stakeholders, and this creates demand for outside directors. However, Rosenstein and Wyatt (1990) suggest small firms will have more outside directors because large firms can rely on alternative monitoring mechanisms (e.g., institutional investors, stock analysts). Consistent with previous IOS studies (e.g., Mian, 1996), we use the book value of assets minus the book value of common equity plus the market value of common equity as a proxy for firm size. This amount is transformed using a natural log and is labelled LNSIZE. However, given the prior discussion, no directional sign is predicted for the coefficient.

### *4.2.4. Model specification*

We test H1 using the following OLS model:

$$\text{DIR} = b_0 + b_1 + \text{IOS} + b_2\ \text{INSDUM} + b_3\ \text{LEV} + b_4\ \text{CEOTEN} + b_5\ \text{BRDMEET} + b_6\ \text{LNSIZE} + e \qquad (1)$$

where DIR, INSDUM, LEV, CEOTEN and LNSIZE are those described in sections 4.2.1.–4.2.3., and $b_0$ is the intercept and e in an error term which is assumed to be normally distributed with zero mean. IOS is either MKTBKA, MKTBKE, P/E, GSALES or a composite IOS measure depending on the exact model.

## 5. Results

### *5.1. Main statistical tests*

Table 1 provides descriptive statistics for DIR and the right-hand side variables. We also examined scatter plots of the distribution for the variables and identified two extreme values for PE (i.e., 110 and 73.3) and extreme values for MKTBKA (9.314) and MKTBKA (19.01) for another firm. Because each of these values are more than 59% larger than the next highest value, these

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[6] Because most firms in our sample are not engaged in research and development (R&D), we omit this variable even though it has been used in prior studies (e.g., Gaver and Gaver, 1993). Industry membership is another variable that has been used as a proxy for IOS in prior research (e.g., Chan et al., 1990). However, as Gaver and Gaver (1993) argue, cross-sectional variation in IOS is also likely at the firm level. Because we are interested in board composition which is a firm-specific decision, we also do not use industry membership.

**Table 1**
**Descriptive statistics**

| *Variable*[a] | *Mean* | *Median* | *Std. dev.* | *Minimum* | *Maximum* | *Number*[b] |
|---|---|---|---|---|---|---|
| DIR | 0.520 | 0.500 | 0.273 | 0.000 | 1.000 | 77 |
| *IOS variables* | | | | | | |
| MKTBK | 1.425 | 1.115 | 0.927 | 0.542 | 5.846 | 77 |
| MKTBKE | 1.611 | 1.270 | 1.264 | 0.318 | 7.881 | 77 |
| P/E | 11.022 | 9.950 | 7.516 | −15.790 | 35.090 | 77 |
| ΔASSETS | 0.185 | 0.044 | 0.669 | −0.845 | 3.424 | 77 |
| *Control variables* | | | | | | |
| INSDUM | 0.208 | 0.000 | 0.408 | 0.000 | 1.000 | 77 |
| LEV | 0.198 | 0.161 | 0.202 | 0.000 | 0.775 | 77 |
| CEOTEN | 6.003 | 5.000 | 4.188 | 0.500 | 18.000 | 77 |
| BRDMEET | 9.61 | 11.000 | 2.987 | 1.000 | 14.000 | 77 |
| LNSIZE | 7.919 | 7.940 | 0.809 | 0.606 | 10.132 | 77 |

[a] DIR = number of independent outside directors/total directors; MKTBKA = market value of firm value to book value of assets; MKTBKE = market value of firm to book value of equity shares; P/E = price per share to primary earnings per share; ΔASSETS = Growth in total assets between 1991–95; INSDUM = percentage of insider (directors and top five managers) ownership INSDUM is coded 1 if inside ownership is less than or equal to 5% and greater than or equal to 25%, and 0 elsewhere; LEV = long term liabilities/total assets; CEOTEN = number of years the CEO has been on the job; BRDMEET = number of board meetings per year; LNSIZE = natural logarithm of firm value.

[b] The sample size of 77 is obtained after omitting three outliers.

three firms are deleted, reducing the sample to 77 from 80.

The mean for DIR is 52% indicating that on average outside directors compromise a majority of the board. The mean of inside ownership is 17% and the mean for CEOTEN is six years. Each of these values is similar to those reported in prior US-based studies (e.g., Mehran, 1995; Dechow et al., 1996).

Table 2 gives a correlation matrix for the IOS and control variables. As predicted, individual IOS measures such as MKTBKA and MKTBKE are significantly and negatively correlated with leverage ($r = -0.409$, $p \leq 0.001$ and $r = -0.379$, $p \leq 0.001$ respectively) which is consistent with previous IOS research (e.g., Smith and Watts, 1992; Gaver and Gaver, 1993; and Barclay and Smith 1995). The INSDUM variable is significantly and negatively correlated with firm size ($r = -0.349$, $p \leq 0.01$) which is similar to prior studies (e.g., Jensen et al., 1992). Also, we find a significant positive correlation between firm size and P/E ratio ($r = 0.429$, $p \leq 0.001$).

Regarding correlations between individual IOS measures, only MKTBKA and MKTBKE are positively and significantly correlated ($r = 0.911$, $p \leq 0.001$). However, there are no significant correlations between other IOS variables. This is surprising as Gaver and Gaver (1993) found statistically significant correlations among all individual IOS variables. However, our correlation tests are not nearly as powerful as the one used by Gaver and Gaver (1993) since they use 1,525 US firm-based observations.

Table 3 provides the multiple regression results for equation 1. The four models shown differ in term of the proxy used for IOS. Each of the models is statistically significant with $R^2$ varying between 20% and 26%. The $R^2$ statistics are comparable to similar models using US data (e.g., Brickley and James, 1987, $R^2 = 26\%$; Bathala and Rao, 1995, $R^2 = 19\%$). Though all four IOS variables have positive signs, only two, MKTBKA and MKTBKE, are statistically significant ($p = 0.01$ based on one-tailed tests). Thus, we find some evidence that investment opportunities require additional monitoring and give managers incentives to hire independent outside directors (Gaver and Gaver, 1993; Booth and Deli, 1996). This supports H1.

Of the control variables, firm size is significant at 0.05 level or better (two-tailed tests) with a negative sign in all three models. This is consistent with Rosenstein and Wyatt's (1990) view that small firms have fewer alternative monitoring mechanisms and, consequently, will rely on outside directors. INSDUM is significant with a negative sign in each of the models indicating that at low levels of managerial ownership, inside ownership is not sufficient to align the manager's interests with the shareholder's interests, and that at

**Table 2**
**Pairwise correlation coefficients**

| | *MKTBKA* | *MKTBKE* | *P/E* | *ΔASSETS* | *INSDUM* | *LEV* | *CEOTEN* | *BRD MEET* | *LNSIZE* |
|---|---|---|---|---|---|---|---|---|---|
| *IOS Variables* | | | | | | | | | |
| MKTBKA | 1.000 | | | | | | | | |
| MKTBKE | 0.911[b] | 1.000 | | | | | | | |
| P/E | −0.111 | −0.005 | 1.000 | | | | | | |
| GSALES | 0.397 | 0.243 | −0.172 | 1.000 | | | | | |
| *Control variables* | | | | | | | | | |
| INSD | −0.067 | −0.098 | −0.072 | −0.085 | 1.000 | | | | |
| LEV | −0.409[b] | −0.379[b] | 0.033 | 0.186 | 0.038 | 1.000 | | | |
| CEOTEN | 0.053 | 0.056 | −0.083 | 0.044 | 0.194 | −0.120 | 1.000 | | |
| BRDMEET | 0.005 | 0.007 | −0.133 | 0.078 | −0.147 | 0.182 | 0.002 | 1.000 | |
| LNSIZE | −0.078 | 0.143 | 0.429[b] | 0.318[c] | −0.349[c] | 0.050 | 0.086 | 0.086 | 1.000 |

[a] See Table 1 for variable definition and sample size.
[b] Significant at 0.001 level based on two-tailed test.
[c] Significant at 0.01 level based on two-tailed test.

Table 3
**Estimated coefficients ($t$-statistic in parentheses) from OLS Regression**[a,b]

|  | Individual IOS variables |  |  | Control variables |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mdl | MKTBKA<br>+ | MKTBKE<br>+ | P/E<br>+ | ΔASSETS<br>+ | INSDUM<br>− | LEV<br>+ | CEOTEN<br>− | BRD MEET<br>+ | LNSIZE<br>+/− | Incpt<br>+/− | MPrb | $R^2$ |
| 1 | 0.084<br>(2.565)[c] |  |  |  | −5.801<br>(−2.002)[c] | 0.388<br>(1.516)[e] | 0.004<br>(0.635) | 0.017<br>(1.754)[d] | −0.103<br>(−2.299)[d] | 1.163<br>(3.064) | 0.005 | 26.2% |
| 2 |  | 0.060<br>(2.505)[c] |  |  | −5.377<br>(−1.869)[c] | 0.398<br>(1.541)[e] | 0.005<br>(0.656) | 0.017<br>(1.759)[d] | −0.124<br>(−2.669)[c] | 1.344<br>(3.490) | 0.005 | 25.9% |
| 3 |  |  | 0.004<br>(0.915) |  | −4.816<br>(−1.662)[c] | 0.181<br>(0.701) | 0.005<br>(0.589) | 0.019<br>(1.877)[d] | −0.107<br>(−2.097)[d] | 1.251<br>(3.083) | 0.044 | 19.8% |
| 4 |  |  |  | 0.406<br>(0.487) | −4.873<br>(−1.920)[c] | 0.330<br>(1.659)[e] | 0.062<br>(0.697) | 0.018<br>(1.753)[d] | −0.094<br>(−2.037)[d] | 1.355<br>(3.658) | 0.026 | 19.3% |

[a] Dependent variable = DIR. See Table 1 for variable definitions. Sample sizes are 79, 79, 78, and 80 after omitting outliers.
[b] Model probability is based on a $F$-statistic. Significance levels for $t$-statistics are based on one-tailed tests except for LNSIZE.
[c] Significant at 0.01 level.
[d] Significant at 0.05 level.
[e] Significant at 0.10 level.

these levels, management may try to entrench itself by adding inside or affiliated outside directors.

The coefficient for BRDMEET is positive and significant at 0.05 level (one-tailed tests) in all four models, indicating that frequently meeting boards are more likely to include outside directors to protect against such behaviour as earnings management and misuse of free cash flows (Menon and Williams, 1994). LEV is positively related to DIR at the 0.10 level (one-tailed test) in models 1 and 2 which suggests that firms with more debt rely on outside directors to minimise conflict between shareholders and debtholders. Finally, CEOTEN is not statistically related to board composition in any of the models, suggesting that this variable is not related to board composition which is contrary to US-based results reported by Hermalin and Weisbach (1988) and Bathala and Rao (1995).[7]

### 5.2. *Additional tests*[8]

#### 5.2.1. *Sensitivity analysis*

The empirical results presented in the preceding section select a particular point in time to observe the relation between board composition and IOS. One problem with the cross-sectional tests is that they do not examine explicitly whether the fraction of outside directors presently employed by a firm is due to the firm's current IOS or due to its historical IOS. Furthermore, the cross-sectional tests do not examine the endogeneity, or reverse causation, between the fraction outside directors and IOS. For example, it is possible that a higher proportion of outside directors provides more effective monitoring, and this leads to higher company performance as measured by market to book ratios.[9] Finally, our coefficient estimates may be 'contaminated' by time invariant fixed firm effects.

To partially address these problems, we investigate whether changes in the fraction of outside directors are related to the changes in IOS on a sub-sample of 53 firms[10]. Changes in the fraction of outside directors and IOS in year *t* are computed for each firm *i* over a five year period 1991–95. For example, the change in the fraction of outside directors in year *t* is computed by the ratio of an increase (decrease) in the fraction of outside directors from *t* to *t*-4 divided by the fraction of outside directors for the year *t*-4 where *t*-4 is 1991 and *t* is 1995. Thus, we estimate the following changes model:

$$\Delta DIR = b_0 + b_1 \ \Delta IOS + \Delta e \qquad (2)$$

where $b_1$ represents an uncontaminated estimate of the relation between IOS and DIR (i.e., fixed effects removed) and where $b_0$ can be interpreted as a time effect.

Table 4 contains the results for the changes model. The results indicate that two of the three IOS models are significant. Contrary to expectations, the coefficient for ΔP/E is not significant at conventional levels. However, the coefficients on ΔMKTBKA and ΔMKTBKE are positively and significantly related at 0.01 and 0.05 levels respectively. These results are consistent with our cross-sectional results and suggest that the fraction of outside directors increases with contemporaneous increases in IOS. Taken together with our earlier tests, the results for IOS appear to be robust.

## 6. Summary and conclusions

This study has examined empirically the determinants of board composition in the NZ corporate sector. Based on Smith and Watts (1992) and Gaver and Gaver (1993), we use an efficient contracting perspective and predict that the use of independent outside directors will differ between high growth and low growth firms. The empirical results obtained from cross-sectional tests of 77 New Zealand firms indicates that the proportion of outside directors is significantly and positively related to IOS, leverage, and the number of board meetings, and is significantly and negatively related to low levels of inside ownership and firm size. In contrast, CEO tenure and high levels of inside ownership do not appear to be significantly related to the proportion of outside directors, at least for our sample. Our results support the view that high growth and the use of outside directors are related. Moreover, we show that the change in outside directors is related to *contemporaneous* changes in IOS.

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[7] Following Hermalin and Weisbach (1991), the regressions were re-run using four piecewise variables for CEOTEN. However, the results were unchanged, and so these results are not reported here.

[8] As in Gaver and Gaver (1993), we used factor analysis to extract a composite IOS measure from the individual IOS variables. The composite measures (proxied by IOSFAC and IOSDUM) yielded results similar to those reported in Table 3. Both IOSFAC and IOSDUM were significant at 0.05 level. To economise on space, however, we do not present these results in this paper.

[9] We are grateful to an anonymous reviewer for making this point. Theoretically, a two-stage least square (2SLS) should be used to test simultaneous effect between the DIR and IOS. Because IOS hypothesis is not adequately developed and because a simultaneous relation between DIR and IOS is difficult to predict on an *ex ante* basis (Bhagat and Black, 1977), 2SLS is not estimated in this study.

[10] Estimation of a fixed-effects covariance model proved difficult on the small cross-sectional and time series data set available. In particular, there was collinearity between the dummy variable INSDUM and the fixed-effects parameters that inhibited the derivation of complete and meaningful coefficient estimates.

**Table 4**
**Estimated coefficient ($t$-statistic in parentheses) from OLS regression changes model**[a]

| | Δ IOS variables | | | | | | |
|---|---|---|---|---|---|---|---|
| Mdl | ΔMKTBKA<br>+ | ΔMKTBKE<br>+ | ΔP/E<br>+ | ΔASSETS<br>+ | Incpt<br>+/− | MPrb[b] | $R^2$ |
| 1 | 0.110<br>(2.922)[c] | | | | 0.404<br>(10.016) | 0.005 | 14.34% |
| 2 | | 0.054<br>(2.494)[d] | | | 0.422<br>(10.690) | 0.020 | 10.87% |
| 3 | | | −0.001<br>(−0.534) | | 0.468<br>(9.197) | 0.596 | 0.56 |
| 4 | | | | −0.036<br>(−0.536) | 0.127<br>(1.938) | 0.058 | 0.025 |

[a] Dependent variable = ΔDIR where $\Delta DIR = DIR_{1995} - DIR_{1991}/DIR_{1991}$. $\Delta MKTBKA = MKTBKA_{1995}$-$MKTBKA_{1991}/MKTBKA_{1991}$; $\Delta MKTBKE = MKTBKE_{1995}$- $MKTBKE_{1991}/MKTBKE_{1991}$; $\Delta P/E = P/E_{1995}$-$P/E_{1991}/P/E_{1991}$, $\Delta Assets = ASSETS_{1995} - ASSETS_{1991}/ASSETS_{1991}$. Sample size is 53 based on all firms with data available for 1991 and 1995.
[b] Model probability is based on a $F$-statistic.
[c] Significant at 0.01 level based on one-tailed test.
[d] Significant at 0.05 level based on one-tailed test.

While both the determinants of board composition and the effect of IOS on corporate policy decisions have been examined extensively in the literature, our study is the first to explicitly examine the effect of IOS on board composition. In doing so, we contribute to, and provide a link between, the largely separate IOS and board composition literatures. From a policy standpoint, our results also suggest that the optimal composition of the board, in terms of inside and outside directors, will not be the same for high and low growth firms. Consequently, mandating that all firms use a majority or super-majority of independent outside directors could result in less efficient (i.e., suboptimal) board structures from a societial point of view (Jensen, 1993).

As with any research, a few caveats deserve mention. First, the empirical tests carried out in our study may suffer from omitted variables. For instance, theoretical and empirical research suggests the number of outside directorships held by CEOs is likely to be affected by supply side factors such as the CEO's career cycle and interlocking boards (Booth and Deli, 1996). Therefore, it is possible that the empirical relations shown in our study could be driven by cross-sectional differences in omitted supply-side factors that affect board composition. A second limitation arises from possible data measurement errors. If our proxies for IOS and outside directors are noisy, measurement error could potentially reduce the statistical power of the tests. Third, the explanatory variables used in our study are considered exogenous, but Smith and Watts (1992), Gaver and Gaver (1993) and others recognise that several explanatory variables used in this research, including IOS, may be endogenous. Fourth, the present study is essentially a single period, small sample analysis. As such, the results reported here might not be as robust as those derived from studies using large cross-sectional and time series data. Lastly, we examine the efficiency of a single mechanism in controlling agency conflicts without considering several alternative means by which a firm can monitor the manager's activity. For instance, a firm can use stock option plans, an audit commitee, external auditors or a mix of these control mechanisms to attain an optimal level of monitoring. We suggest that each of these limitations provides an area for future research.

## References

Agrawal, A. and Knoeber, C. R. (1996). 'Firm performance and mechanisms to control agency problems between managers and shareholders'. *Journal of Financial and Quantitative Analysis*, 31 (September): 377–397.

Alchian, A. A. and Woodward, S. (1988). 'The firm is dead; long live the firm: a review of Oliver E. Williamson's "The economic institutions of capitalism". *Journal of Economic Literature*, 26 (March): 65–71.

Ahmed, A. S. (1994). 'Accounting earnings and future economic rents: an empirical analysis.' *Journal of Accounting and Economics*, 21 (November): 377–400.

Baber, W. R., Janakiraman, S. N., and Kang, S-H. (1994). 'Investment opportunities and the structure of executive compensation'. *Journal of Accounting and Economics*, 21 (November): 297–318.

Barclay, M. J. and Smith, C. W. (1995). 'The maturity structure of corporate debt.' *Journal of Finance*, 50 (March): 609–631.

Bathala, C. T. and Rao, R. P. (1995). 'The determinants of board composition: an agency theory perspective'. *Managerial and Decision Economics*, 16 (January/February): 59–69.

Bhagat, S. and Black, B. (1997). 'The uncertain relationship between board composition and firm performance'. Columbia Law School. Working Paper, New York.

Booth, J. R. and Deli, D. N. (1996). 'Factors affecting the number of outside directorships held by CEOs'. *Journal of Financial Economics*, 40 (January): 81–104.

Brickley, J. A. and James, C. M. (1987). 'The takeover market, corporate board composition, and ownership structure: the case of banking'. *Journal of Law and Economics*, 30 (June): 161–180.

Brickley, J. A., Coles, J. L. and Terry, R. L. (1994). 'Outside directors and the adoption of poison pills'. *Journal of Financial Economics*, 35 (3): 371–390.

Brickley, J. A., Smith, C. W. and Zimmerman, J. L. (1997). *Managerial Economics and Organizational Architecture*. Chicago: Irwin.

Byrd, J. W. and Hickman, K. A. (1992). 'Do outside directors monitor managers?: evidence from tender offer bids'. *Journal of Financial Economics*, 32 (October): 195–221.

Chan, S. H. Martin, J. and Kensinger, J. (1990). 'Corporate research and development expenditures and share value'. *Journal of Financial Economics*, 26 (August): 255–276.

Chung, K. H. and Charoenwong, C. (1991). 'Investment options, assets in place, and the risk of stocks'. *Financial Management*, 20 (Autumn): 21–33.

Dechow, P. M., Sloan, R. G. and Sweeney, A. P. (1996). 'Causes and consequences of earnings manipulation: an analysis of firms subject to enforcement actions by the SEC'. *Contemporary Accounting Research*, 13 (Spring): 1–36.

Fama, E. and Jensen, M. C. (1983). 'Separation of ownership and control'. *Journal of Law and Economics*, 26 (June): 301–325.

Gaver, J. J. and Gaver, K. M. (1993). 'Additional evidence on the association between the investment opportunity set and corporate financing, dividend, and compensation policies'. *Journal of Accounting and Economics*, 16 (January/April/July): 127–160.

Hermalin, B. E. and Weisbach, M. S. (1988). 'The determinants of board composition'. *Rand Journal of Economics*, 19 (Winter): 589–606.

Hermalin, B. E. and Weisbach, M. S. (1991). 'The effects of board composition and direct incentives on firm performance'. *Financial Management*, 20 (Winter): 101–112.

Hodder, J. (1993). 'The bill returns — directors and liquidations'. *Accountants' Journal*, 72 (February): 38–40.

Jensen, G. R., Solberg, D. P. and Zorn, T. S. (1992). 'Simultaneous determination of inside ownership, debt and dividend policies'. *Journal of Financial and Quantitative Analysis*, 27 (June): 247–263.

Jensen, M. C. (1986). 'Agency costs of free cash flow, corporate finance, and takeovers'. *American Economic Review*, 76 (May): 323–329.

Jensen, M. C. (1993). 'The modern industrial revolution, exit, and the failure of internal control systems'. *The Journal of Finance*, 48 (July): 831–880.

Jensen, M. C. and Meckling, W. H. (1976). 'Theory of the firm: management behaviour, agency costs and ownership structure'. *Journal of Financial Economics*, 3 (October): 305–360.

Jensen, M. C. and Meckling, W. H. (1995). 'Specific and general knowledge, and organizational structure'. *Journal of Applied Corporate Finance*, 8 (Summer): 4–18.

Jung, K., Kim, Y-C. and Stulz, R. E. (1996). 'Timing, investment opportunities, managerial discretion, and the security issue decision'. *Journal of Financial Economics*, 42 (October): 159–185.

Klein, A. (1998). 'Firm performance and board committee structure'. *The Journal of Law and Economics*, 41 (April): 275–303.

Lang, L., Ofek, E. and Stulz, R. M. (1996). 'Leverage, investment, and firm growth'. *Journal of Financial Economics*, 40 (January): 3–29.

Lee, C. I., Rosenstein, S., Rangan, N. and Davidson, W. N. (1992). 'Board composition and shareholder wealth: the case of management buyouts'. *Financial Management*, 21 (Spring): 58–72.

Mehran, H. (1995). 'Executive compensation structure, ownership and firm performance'. *Journal of Financial Economics*, 38 (June): 163–184.

Menon, K. and Williams, J. D. (1994). 'The use of audit committees for monitoring'. *Journal of Accounting and Public Policy*, 13 (Summer): 121–139.

Mian, S. L. (1996). 'Evidence on corporate hedging policy'. *Journal of Financial and Quantitative Analysis*, 31 (September): 419–439.

Morck, R., Shleifer, A. and Vishny, R. W. (1988). 'Management ownership and market valuation: an empirical analysis'. *Journal of Financial Economics*, 20 (January/March): 293–315.

Myers, S. C. (1977). 'Determinants of corporate borrowing'. *Journal of Financial Economics*, 5 (November): 141–175.

New Zealand Stock Exchange (NZSE) (1995), *Share Market Review*. Wellington: NZSE Press.

Patton, A. and Baker, J. (1987). 'Why won't directors rock the boat?' *Harvard Business Review*, 65 (September): 10–12.

Penman, S. H. (1996). 'The articulation of price-earnings ratios and market to book ratios and the evaluation of growth'. *Journal of Accounting Research*, 34 (Autumn): 235–259.

Pilotte, E. (1992). 'Growth opportunities and the stock price response to new financing'. *Journal of Business*, 65 (July): 371–394.

Rediker, K. J. and Seth, A. (1995). 'Board of directors and substitution effects of alternative governance mechanisms'. *Strategic Management Journal*, 16 (February): 85–99.

Rosenstein, S. and Wyatt, J. G. (1990). 'Outside directors, board independence, and shareholder wealth'. *Journal of Financial Economics*, 26 (August): 175–191.

Shleifer, A. and Vishy, R. (1997). 'A survey of corporate governance'. *Journal of Finance*, 52 (June): 737–783.

Skinner, D. J. (1993). 'The investment opportunity set and accounting procedure choice—preliminary evidence'. *Journal of Accounting Economics*, 16 (October): 407–445.

Smith, C. W. and Watts, R. L. (1992). 'The investment opportunity set and corporate financing, dividend, and compensation policies'. *Journal of Financial Economics*, 32 (December): 263–292.

Titman, S. and Wessels, R. (1988). 'The determinants of capital structure choice'. *The Journal of Finance*, 43 (March): 1–40.

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# Performance measurement and the use of league tables: some experimental evidence of dysfunctional consequences

**Kevin Keasey, Philip Moon and Darren Duxbury***

**Abstract**—The practice of organisations adopting performance measurement systems that utilise a range of key performance indicators linked to various aspects of corporate strategy has become widespread. At the same time, however, many organisations are developing reporting frameworks that summarise these indicators in the form of a league table, ranking sub-units according to their achievements. The use of such league tables has the capacity to create a form of dysfunctional behaviour as managers focus primarily on their league table positions—the notion of measure fixation. This paper describes a new experiment that seeks to explore this possibility. The results suggest that information concerning the change in league table position leads to an increase in risk-seeking behaviour, particularly where a project proposal creates an opportunity for the manager's sub-unit to move to the top of the league table. This is an unintended dysfunctional consequence of using league tables within performance measurement system design.

**Key words:** Performance measurement, league tables, risk

## 1. Introduction

> *Shortly before the end of the 1996-7 English Premier League soccer season, a disgruntled Middlesborough supporter rang in to a Radio 5 'phone-in' programme. Despite winning their way to both domestic cup finals, his team were languishing at the foot of the league table.*
> *'We are too good to go down,' he contested.*
> *'Ah, but, I have to tell you,' came the response from the phone-in host, Alan Green, 'the table tells the truth'.*
> *A few weeks later, Middlesborough were indeed relegated.*

In recent years, league tables seem to have become part of the language of performance measurement. While league tables are utilised worldwide in sports contexts as a primary means of gauging success, they are now surfacing in the West as a means of assessing the performance of many public and private sector organisations. In the UK, perhaps the most widely publicised usage is the Secondary Schools League Tables that attempt to summarise the GCSE and Advanced Level examination performance of all schools, ranking them in descending order of achievement based on, for example, the percentage of pupils entered who gained five (or more) GCSE passes at grades A to C. Not surprisingly, the construction of a comparative performance framework in this way remains the subject of intense criticism in the academic literature (see, for example, Goldstein and Woodhouse, 1988; Magennis et al., 1995; Cowan and Morrison, 1996). It is interesting to note, however, that although Schools league tables have only appeared in recent years, much of the press commentary is now concerned with tracking the fortunes of individual schools: for instance, John O'Leary's introduction to the complete league tables in *The Times* (November 18, 1997) states: 'This year's league tables are bigger and, in terms of results, better than ever. The array of information now includes a four-year record of GCSE scores to allow parents to gauge improvement'. Therefore, notwithstanding any academic criticism, league table position seems to have become increasingly accepted as an indicator of 'performance' and so a proxy for 'quality'. University academics in the UK are familiar with similar developments in their own sector. As an example take Leslie Wagner's defence of the use of league tables as a means of measuring performance of universities in the 25 September 1998 issue of *The Times Higher Education Supplement*.

In the private sector, too, studies by Moon and Fitzgerald (1996) and Fitzgerald and Moon (1996) document evidence of companies summarising the

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performance of sub-units within league tables, these being regularly updated and widely disclosed within the organisation. The tables display a ranking derived from the performance of sub-units on one or more specific dimensions with, in general, little allowance being made for different operating contexts, whether economic, social or geographical. The clear message is that being near the top warrants praise, while being near the bottom demands improvement. There is no market for excuses (Fitzgerald and Moon, 1997). A sub-unit's position in the league table matters.

At the same time the current consensus of the performance measurement research literature is that there is a need to evaluate performance across a wide range of dimensions, both financial and non-financial. The potential shortcomings of using a single indicator of performance are well understood. Short run profitability, for example, is only one of a multitude of factors contributing to an organisation's long run objectives. It is virtually impossible to capture in one financial measure all the variables that contribute to the success or otherwise of a sub-unit. Two or more sub-units may generate the same level of short run profitability over a given evaluation period; however, focus on this single financial measure masks the means by which the performance was achieved. One manager may have increased short run profitability by dramatically reducing costs at the expense of product quality and long term customer loyalty. Another manager may have achieved the same level of profitability based on the development of long term customer loyalty over previous periods of evaluation. The latter position is sustainable in the long term whilst the former is not. The use of a single financial measure of performance would not highlight these differences. Wilson and Chua (1993:364), comment that:

> ...whatever index of performance is chosen must encompass a variety of factors, but it is extremely difficult to conceive of a *single* measure that embraces *all* the key factors [our italics]...An index based on cost is likely to be too narrow since it excludes revenue issues. On the other hand, a profit index accommodates both revenue and cost but excludes such important issues as (i) customer loyalty, (ii) establishing good employee relations, and (iii) building a skilled team.

A further danger is that single indicators of performance may lead to dysfunctional behaviour as managers may seek to manipulate that indicator in their own interests. The authors proceed to recommend the use of a range of measures to combat these shortcomings. The four main performance measurement frameworks that have emerged in the literature—the Lynch and Cross performance pyramid (1991), the Fitzgerald et al. results and determinants matrix (1991), the Kaplan and Norton balanced scorecard (1992) and the EFQM (European Foundation of Quality Management) business excellence model (see *Business Intelligence*, 1998, for a good review of this approach to performance measurement)—are all characterised by the adoption of a multitude of measures, non-financial as well as financial and, at least in principle, qualitative as well as quantitative.

The evaluation of performance based on a multitude of performance indicators is not, however, without its problems. Evaluation of performance based on a number of indicators may result in conflicting evidence. For example, a sub-unit may perform excellently based on product quality measures (for example, based on the number of goods returned by customers) but may perform poorly based on manufacturing efficiency measures (for example, wastage rates for raw materials). Jensen (1976) discusses various methods devised to aid the presentation and analysis of multi-variate data based on either visual display techniques (for example, principle component profiles and plotted caricatures) or numerical taxonomy (for example, factor or cluster analysis). Jensen (1976) concludes that, whilst visual display techniques may be adequate for the representation of a small number of performance indicators, they become cumbersome and open to the issue of subjectivity as the number of indicators increases. The development of mathematical techniques was intended to overcome such problems by generating 'objective' groupings or classifications. Unfortunately the variety of techniques available generally provide a variety of conflicting classifications. It is not clear in which scenarios a particular method should be preferred.

The discussion above highlights the difficulty of evaluating overall performance based on a number of conflicting performance indicators. Many organisations have responded to these difficulties by aggregating independent measures into a single, overall performance measure (for example, league table position). This move has been driven by the need for transparency of the evaluation system in order to promote its use as a motivational device to improve performance.

The developments in performance *measurement* described above have led to an issue that needs addressing; namely, if the outcomes from a range of measures are somehow combined to provide an overall league table ranking of performance, might managers' attention not become overly focused on their league table position rather than on the underlying determinant factors? That is, does another kind of dysfunctional behaviour become apparent as managers look to evaluate projects in terms of their likely impact on league table position rather than their profitability or their congruence with other corporate objectives?

The current paper seeks to investigate this issue using an experimental methodology set in the context of expenditure decisions within a private sector corporation. Based on the summarising work of Smith (1995), the next section provides a background to the dysfunctional consequences of performance measurement, while Section 3 discusses the use of league table position as an indicator of performance. A new research experiment is described in Section 4, while in Section 5 the results are presented and analysed. The issue of external validity of the results is discussed in Section 6. The final section offers conclusions.

## 2. Performance measurement and dysfunctional consequences

The activities of most organisations are multi-dimensional, complex and interwoven and, therefore, the capturing of performance is problematic and often elusive. This has not, however, stopped organisations, both public and private, from seeking to develop performance measurement systems. The arguments for the development of performance systems and indicators are numerous and include notions of control, greater efficiency, enhanced competition and transparency of activity. The organisation is commonly viewed from the perspective of managerial cybernetics (Beer, 1966), in which the organisational objectives are identified, well defined and agreed. To meet these objectives, targets are set in terms of a diverse range of performance indicators. Failure to meet targets results in corrective remedial action and/or a revision of target. This corresponds to the simple 'central heating model' of organisations. As noted earlier and by authors such as Argyris (1952, 1953) and Hopwood (1973), organisations are, however, complex entities comprising of ill-defined and interwoven human activity. Furthermore, the primary elements of organisations (human beings) are intelligent and capable of manipulating performance systems for their own benefit. In fact, one feature of the performance management literature (for example, see Ezzamel and Hart, 1987) is the emphasis given to the dysfunctional consequences of performance indicators. Therefore, this paper's exploration of the potential dysfunctional nature of the recent use of league tables as a means of performance measurement is preceded and well grounded in an extensive existing literature.

Before exploring a potentially dysfunctional consequence of league tables, a review of the form such consequences may take is required. Expanding on the earlier work by Birnberg et al. (1983)[1], Smith (1995) discusses the following types of dysfunctional consequences: misinterpretation, gaming, ossification, tunnel vision, suboptimisation, myopia, misrepresentation and measure fixation. This study is concerned solely with the detection of measure fixation as a dysfunctional consequence of the use of league tables. It is to a consideration of this phenomenon that the discussion now turns.

Smith (1995) interprets measure fixation as an over-emphasis on the defined measures of success rather than on the objectives of the organisation. It arises because of the difficulty of devising comprehensive performance measures that fully capture the objectives of the organisation. In such a situation it would not be surprising if individuals pursued strategies that focused on the performance measures rather than on the more general objectives of the organisation. In a university context, the emphasis by some academics on achieving a certain number of publications in specified journals to the detriment of other aspects of their duties (for example, lecturing and administration) is a good example of measure fixation.

While it must be recognised that the use of league tables as part of a performance measurement system may lead to a number of the dysfunctional consequences highlighted by Smith (1995), this paper focuses only on measure fixation. As explained in the next section, the easy comparability and the high visibility of league table position makes it a prime candidate for measure fixation.

## 3. League tables as an indicator of performance

The discussion of Jensen (1979) above highlights the problems of grouping or evaluating overall performance based on a number of indicators. In an attempt to overcome these problems, many organisations have begun to compute an aggregate measure of performance and report this in summary form via the use of league tables. This paper is concerned with the possible consequences of using league tables to report operating performance within a private sector organisation. As background to, and justification for, the design of the research experiment that follows, this section explores two key questions. How, in practice, are league tables constructed and what evidence is there as to how the league tables are perceived by the managers whose performance they depict in such organisations?

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[1] The Birnberg et al. (1983) study details six dysfunctional consequences (smoothing, biasing, focusing, gaming, filtering and illegal acts), which (with the exception of gaming and illegal acts) can be viewed as subcategories of Smith's (1995) misrepresentation.

In one sense the answer to the first question is straightforward. A set of '*k*' performance indicators are established by top managers as representing key measures within particular area(s) of activity. That is, they correspond to some of the organisation's noted critical success factors—those factors which an organisation needs to achieve to ensure success in its business segment. Let these be denoted $\{p_{i,j,t}\}$ with $i=1,2,\ldots,k$ representing a performance indicator for a given sub-unit *j* and a given time period *t*. These indicators could be financial or non-financial, quantitative or qualitative. Thus, for example $p_{1,A,T}$ might represent Division *A*'s net profit for month *T*, $p_{2,A,T}$ the number of customer complaints received and $p_{k,A,T}$ the modal customer satisfaction rating achieved, again for Divison *A* in month *T*.

Having a substantial set of measures for many sub-units, however, does not of itself facilitate a direct comparison of each sub-unit's 'overall' performance, as each sub-unit will, no doubt, fare better on some dimensions and worse on others. So how is an overall ranking achieved? One possibility is to adopt a non-compensatory, lexicographic ordering model (Payne, 1976) by designating one dimension as the most important, and to use performance on this dimension as the basis for constructing the league table, and so drawing comparisons across different sub-units. Moon and Fitzgerald (1996) report on the use of this method by TNT Express (UK) Ltd. While seven separate delivery performance indicators were extracted weekly for each depot, it was the delivery-on-time measure that was deemed to be the most important and so used as the basis for ranking within the league table; the depot at the top of the league being the one with the highest on-time delivery statistics. Moon and Fitzgerald (1996) comment on the inherent inequity of this approach, with the Belfast depot nearly always ranked last in the table, entirely as a consequence of its geographical location.

A second possibility would be to adopt a compensatory mechanism such as the linear additive model (Tversky, 1969; Olshavsky, 1979) where all indicators are encapsulated into a single measure, which is then used to provide a comprehensive ranking. Thus, first each indicator $p_{i,j,t}$ is converted to a consistent numeric $q_{i,j,t}$ perhaps a score between 0 and 10. A maximum '10' could correspond, for example, to zero absenteeism, a profit higher than budget, or more than 95% of customer complaints responded to within three working days. Obviously, any particular parameter could be periodically adjusted as part of an organisational continuous improvement programme. Next a set of weights $w_i$ $(i=1,2,\ldots,k)$ is developed, reflecting management's views regarding the relative importance of each performance dimension. The raw scores are multiplied by the weights and summed to derive an all-encompassing performance statistic, $S_{j,t}$ where

$$S_{j,t}=\Sigma w_i q_{i,j,t} \text{ (over } i=1 \text{ to } k).$$

The league table is then produced for each period *t* in descending order of the $S_j$.

Fitzgerald and Moon (1997) report on a leading UK food retailing corporation, disguised as FR plc, that adopts this kind of basis for producing its customer service league tables. Eight dimensions of performance were assessed and quantified for each store; training, absenteeism, labour turnover, an operating checklist (layout of merchandise, helpfulness of staff etc.), mystery shopper results, customer compliments and complaints, and the cleanliness of the store in general and the customer toilets in particular. These results were then weighted to derive an overall score, which formed the basis for ranking in the league table. Their evidence indicates that frequently the top ranked store may not have achieved as many maximum scores as other stores or indeed may even have recorded the lowest score on certain indicators. The weighting and aggregation process determines a store's league position.

The second issue raised at the start of this section addresses the perceptions of the league tables held by managers within the organisation. Case study evidence (Moon and Fitzgerald, 1996; Fitzgerald and Moon, 1997) suggests two main reasons why the league tables are seen as carrying substantial importance. First, they display detailed information, which can (and does) benefit the operation of specific sub-units. Based on interviews with regional managers, Moon and Fitzgerald (1997) provide evidence that the production of league tables allows managers to identify areas of poor performance and, based on best practice elsewhere in the organisation, undertake corrective action. So the information underlying the league table position may have internal benchmarking applications, with an accompanying emphasis on always seeking to do better or achieve more. The second reason why league tables are seen as important is rather more pragmatic in an individualistic sense. Moon and Fitzgerald (1996) report interview evidence regarding the importance of position within the league table. The league table, and in particular the sub-unit's position within it, provides a transparent summary of apparent success (or failure). Everyone looks at the league tables, so everyone knows when a sub-unit's position is rising—or falling. This notion is strengthened further by the following tale reported by Pratt (1996):

> Last year, First Tennessee Bank was wrapping up its best year ever in the Government

> agency debt business, and its top staffers were eagerly awaiting what looked to be a banner year for First Tennessee in the year-end league tables for fixed income. Then came the bombshell. Under pressure from Wall Street's bulge bracket firms, Securities Data Co. decided to amend its policy on agency underwriting. It announced that it would purge from the league table all bonds callable in less than one year—the very bread and butter of First Tennessee's business. In many ways First Tennessee was almost a perfect victim for a powerplay that cut off its rankings' legs while courteously allowing the bulge players to forge ahead.

Despite a year of high achievement, the initial reaction of the managers at First Tennessee was disappointment. Their frame of reference seems to have been developed primarily in terms of relative league table standing. While this quote highlights several potentially illuminating research issues such as the internal construct validity of league tables, how standards are set, and how changes to the measurement framework are agreed, it also raises the issue which forms the key focus of this paper. Can their position in the league table become the predominant focus of managers' attention within an organisation, at the expense of more direct measures of performance? In particular, can the use of league tables lead to dysfunctional behaviour and sub-optimal performance? In the next section we describe a new research experiment that seeks to investigate this possiblity.

## 4. Experimental design

*Task*

Each participant was asked to imagine that he or she was a general store manager for Foodrink plc, a major UK food retail organisation. Participants were given details of Foodrink's performance measurement system (see below) which is publicised within the organisation via a league table ranking. They were also presented with independent project proposals for implementation at different stores. More specifically, each participant was asked to consider four independent project proposals in total, each project proposal being assigned to a different store. Each project was characterised by uncertainty in that there were two possible outcomes. One outcome was favourable in that a positive cash flow would arise and (for the experimental groups) the store's league table position would be expected to rise. The other outcome was unfavourable with the opposite consequences. Participants were required to evaluate each project on its own merits and decide whether or not to undertake it.

*Hypothesis*

The key research issue is to investigate whether an expected impact on league table position might influence decision-making behaviour. Accordingly the null hypothesis is set out as follows:

$H_0$ Investment decisions will not be influenced by anticipated changes in league table position.

*Procedure*

Each participant in the study was given a six-page, stapled pack that formed the experimental instrument. The first page briefly introduced the experiment, thanked subjects for taking part and requested various personal characteristic boxes to be checked. The second page contained background information on Foodrink plc, describing the company as being a major UK food retail organisation which, within the northern region, operates from 16 superstores (labelled Store A to Store P), each store selling a full range of food and drink products. It was explained that each participant was to consider him/herself as the general store manager. The instructions then set out the main characteristics of Foodrink's performance measurement system.

Store performance at Foodrink plc is measured across the following five dimensions:

- store net profit: (revenue less costs);
- wastage: (£ value of products past their sell-by-date);
- absenteeism: (average staff absence/total person-days available);
- customer compliments and complaints: (totals received in writing);
- mystery shopper: (external assessment of customer service across a wide range of factors)

Performance measures are extracted monthly, and converted to a numerical score for each dimension. These scores are then weighted and totalled to derive an overall performance score. A monthly league table is produced showing the 16 superstores in the region ranked by their overall performance score, with the top ranking store in first place. It was also explained that all general managers are paid a fixed salary and that Foodrink plc do not operate any form of bonus scheme.

Pages three to six of the experimental instrument each contained details of an *independent* project proposal to a *different* store—each participant, therefore, being asked to consider four independent project proposals in total, with each proposal being for a different store. For illustration, the Appendix to this paper reproduces the project proposal sheet for version A1: this layout was adopted for all project proposals. For each one, participants were asked to imagine they were in charge

**Table 1**
**Summary of project outcomes**

| | | **Impact on league table position** | |
|---|---|---|---|
| | | *probability* | *probability* |
| | move up 1 place | 2/3 | 1/3 |
| | move down 1 place | 1/3 | 2/3 |
| **Expected monthly financial impact** | | | |
| | £2,000 surplus | **Project 1** | **Project 2** |
| | £2,000 deficit | **Project 3** | **Project 4** |

of the store in question, to carefully read all the given information, to evaluate the project on its own merits and so to decide whether or not they would undertake the project.

Four different project proposals were used, each being designed to carry benefits (and costs) in more than straight financial terms. Project 1 was concerned with the creation of some shelf space for the sale of newspapers and magazines. Potential sales income must be balanced against the direct costs of the newspapers and magazines as well as the opportunity cost of the products displaced. Some customers, however, might be expected to formally object to the store becoming 'more like a newsagent'. Project 2 was concerned with the creation of an in-store fresh cake-baking facility, strategically positioned near the checkouts. Potential profits from cake sales must be balanced against increased losses from wastage as well as a possible fall in mystery shopper performance as relocated products are difficult to find and the average queuing times within the store increase. Project 3 was concerned with whether to introduce monthly loyalty bonuses in an attempt to reduce absenteeism among part-time checkout staff, and so avoid the time and cost of finding replacement personnel at short notice. Absenteeism performance would be expected to improve, but this needs to be balanced with the resentment the scheme might cause with non-checkout staff. Finally, project 4 was concerned with whether to introduce a pay-and-display system in the car park; parking fees being refundable if customers spend more than £5 in the store. This is aimed at deterring non-shoppers from using the parking facility—thus improving customer service—or at least charging them if they persist, but this may also lead to a fall in overall sales at the low volume end of the market.

The relative success of each project depended on which of two possible outcomes (X or Y) would occur. The anticipated impact of the two outcomes in terms of profits and league table position was summarised on the project sheet, again as demonstrated in the Appendix. These outcomes differed for the four projects as shown in Table 1. Thus, for example, project 1 generates an expected monthly financial surplus of £2,000 and is twice as likely to lead to a rise in league table position than a decline. To avoid potential interference effects that might confound the results, the magnitude of the expected financial surplus or deficit was held at £2,000 for all projects, the financial loss in the event of the unfavourable outcome occurring was always £8,000, outcome probabilities were always one-third or two-thirds, and the league table positions could change by one place only.

There were four different stores, identical in all ways excepting their current league table position. The version A store was currently in second place in the league table, so that a favourable outcome would move it into top spot. The version B store was in mid-table, currently lying 8th, while the version C store was 15th, one place above the bottom of the table. These three represented the experimental stores. The version D store was a control. Its current league table position was not given, and for all four projects, while the financial outcomes remained as above, it was explicitly stated that there would be *no change* in league table position for this store.

The four projects all have two possible outcomes: one is positive in terms of both cash flow and change in league position, whilst the other is negative in terms of both cash flow and change in league position. On first consideration it may appear that the two effects are always in the same direction and are therefore confounded. If this were the case it would not be possible to detect any dysfunctional consequences. However, it is not the intention to make comparisons across projects to detect dysfunctional consequences, but across stores (A-D). These stores are identical except for their league position (see above), therefore, any differences across the stores can only be the result of league table position. Individual, paired comparisons of the three experimental stores (A-C) with the control store (D), on a project by project basis, will, therefore, permit the detection of dysfunctional consequences as a result of the use of league tables in performance measurement. For example, any difference in the acceptance rate for project 2 across stores A and D can only be the result of the high league position in store A and could, therefore, be construed as a dysfunctional consequence of the use of league tables.

A Latin Square design was incorporated such that each participant received one of each version (A, B, C and D) and one of each project (1, 2, 3 and 4); that is one of the 24 alternative combinations. Within each combination, the sequence of project proposals received was randomised. Thus, for example, subject 1's pack comprised proposal D4 followed by A1, C3 and lastly B2.

*Subjects*

A total of 151 subjects participated in the experiment (95 male, 56 female), all being undergraduate students from a leading UK business school with experience of modules in financial and management accounting, economics, general management and quantitative methods.

No incentive payments were made to participants. While some such reward mechanism might have been considered desirable, arguably motivating them to exert more effort in arriving at their decisions, the explicit design of any scheme in this instance is problematic. In particular, two considerations influenced the decision not to adopt any form of incentive scheme. First, it is clear that the financial impacts are (necessarily) too high to allow them to be played out for real. Scaling them down, however, might have a distorting effect on the issues being tested. For instance, suppose that in line with other decision-making research experiments (e.g. Thaler and Johnson, 1990), something like one in 10 subjects played out one of their four projects (that is, the actual outcome of that project was determined via a draw in accordance with the underlying probabilities) for real money scaled at, say, £1 cash for every £1,000 in the scenario. Then, while project A3, for example, requires the weighing up of an expected £2,000 loss against an expected rise in the league table, the incentive scheme effectively reduces this to a negligible expected loss in real cash terms of £2 for the same league table impact. Beattie and Loomes (1997) discuss this scaling problem at length and conclude, on the basis of the evidence provided by an experimental study, that alternative forms of incentive scheme (including an absence of incentives) do not yield significantly different results. Second, there remains the ethical issue of whether it is appropriate to allow the possibility of participants having to pay the experimenter (£8 in the above illustration) in the event of an unfavourable outcome. For the above reasons, no incentive scheme was adopted in the current study.

## 5. Results and analysis

All 151 subjects made definite choices on each of the four project proposals they scrutinised. Only three subjects always made the same decision, two rejecting all four proposals and one accepting them all. A complete exposition of results across all versions of the experimental instrument is provided in Table 2 below.

In total 309 projects (51%) were accepted and 295 rejected (49%). No significant gender differences were apparent, male participants accepting 186 projects and rejecting 194, female participants accepting 123 and rejecting 101 ($\chi^2 = 1.76$, $p > 0.18$). Nor was the amount of work experience an influencing factor.[2] Classifying overall responses as greater than 12 months' work experience, three to 12 months, and less than three months' again did not produce a significant effect ($\chi^2 = 0.92$, 2 df $p > 0.37$).

There was a substantial difference, however, in the proportions accepted and rejected for the four projects individually. For project 1 (across all four stores, A, B, C and D), 127 of 151 respondents (84%) chose to accept the proposal, comparative figures for the projects 2, 3 and 4 being 62%, 33% and 25% respectively. A similar pattern is observed for the control store (D) in isolation, corresponding results being 76%, 51%, 29% and 21%. Superficially, then, the projects with expected financial surpluses are viewed favourably, while those with expected deficits were viewed unfavourably.[3] Closer examination of the results, however, reveals response differences across the three experimental stores. As shown in Table 2, 101 of the 151 respondents to version A (corresponding to the store currently in second spot) accepted the project compared with 76 of 151 for version B (store currently in eighth spot). This difference is significant at the 0.01 level ($\chi^2 = 7.86$). Similarly, a significantly higher number of acceptances was found for version A than for version C ($\chi^2 = 15.49$, $p < 0.01$). The difference between B and C, though, was not significant ($\chi^2 = 1.08$, $p > 0.30$). Overall, then, initial league table position seems to have a bearing on the willingness of subjects to take on a given amount of risk but only where that initial position is high.

This finding is examined further by considering pairwise comparisons for all four project proposals

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[2] Providing further evidence that the use of student participants should not be considered problematic with respect to the transferability of the reported results from the experimental setting to the 'real world'.

[3] While not the primary interest of the study, this fact does illustrate that the participants were taking the task seriously.

**Table 2**
**Summary of Experimental Results**

| | | A | B | C | D | TOTAL |
|---|---|---|---|---|---|---|
| *Current store league table position* | | *2nd* | *8th* | *15th* | *not specified* | |
| **Project 1** *(EV+; bp2,000p.m.)* | | | | | | |
| | accept | 35 | 36 | 28 | 28 | 127 |
| | reject | 4 | 2 | 9 | 9 | 24 |
| | | 39 | 38 | 37 | 37 | 151 |
| **Project 2** *(EV+£2,000 p.m.)* | | | | | | |
| | accept | 33 | 20 | 22 | 19 | 94 |
| | reject | 6 | 17 | 16 | 18 | 57 |
| | | 39 | 37 | 38 | 37 | 151 |
| **Project 3** *(EV−£2,000 p.m.)* | | | | | | |
| | accept | 20 | 11 | 8 | 11 | 50 |
| | reject | 17 | 27 | 30 | 27 | 101 |
| | | 37 | 38 | 38 | 38 | 151 |
| **Project 4** *(EV−£2,000 p.m.)* | | | | | | |
| | accept | 13 | 9 | 8 | 8 | 38 |
| | reject | 23 | 29 | 30 | 31 | 113 |
| | | 36 | 38 | 38 | 39 | 151 |
| **Total of all projects** | | | | | | |
| | accept | 101 | 76 | 66 | 66 | 309 |
| | reject | 50 | 75 | 85 | 85 | 295 |
| | | 151 | 151 | 151 | 151 | 604 |

(1, 2, 3 and 4) for each experimental version (A, B or C) against the control version (D). Three pairwise comparisons (A and D, B and D, and C and D) were undertaken for each of the four projects separately. Clearly, this should enable any effects due to the league table position alone to be highlighted. The relevant chi-squared statistics are presented in Table 3.

For project 1, versions A and B together were significantly more attractive than the control; this was not found for version C. For this project, then, the additional dimension of league table position acts as a positive influence—a further justification for acceptance—except where there is some possibility of declining to the foot of the stores league table (version C).

For project 2, while the expected cash flows are positive, there is a two in three chance of losing a place in the league table. The presence of the anticipated league table changes only impacted on version A, the store currently in second spot. Here, subjects were more willing to take the risk given the possibility of achieving top spot: the initial position of strength perhaps inducing an enhanced confidence in that store's ability to make things happen, causing some mental adjustment to the outcome probabilities. This finding echoes that of Thaler and Johnson (1990) that the presence of a prior gain leads an individual to become more risk seeking in subsequent decision-making behaviour; the so-called 'house money' effect.

The experimental conditions for project 3 were the reverse of project 2: negative expected profits but a two in three chance of rising in the league table. Again, it was only the responses to version A that were significantly different to the control, more than half of subjects being willing to accept this project under A compared with less than 30% for each of the other three versions. Here, it seems, some subjects simply ignore the financial expectations (or at least decide the downside risk is sufficiently bounded) and choose on the basis of the given probabilities, the possibility of going top once more acting as a strong influencing factor. This is interpreted as clear evidence of dysfunctional behaviour, resulting from an over-emphasis of the impact on league table positions (measure fixation).

Finally, for project 4, although there was evidence of a tendency for participants to view version A as more attractive, with an acceptance rate in excess of 50% higher than that for B, C or D,

**Table 3**
**Pairwise chi-squared statistics**

| | *A v D* | *B v D* | *C v D* |
|---|---|---|---|
| **Project 1** | ω | ω | 0.00 |
| **Project 2** | 8.24** | 0.00 | 0.11 |
| **Project 3** | 3.89* | 0.06 | 0.28 |
| **Project 4** | 1.55 | 0.00 | 0.05 |

All $\chi^2$ statistics shown have been computed using Yates' correction for 2 × 2 contingency tables (see, for example, Beer, 1982: 27)

ω $\chi^2$ test invalid where cell sizes $<5$; $\chi^2$ for A and B combined against D is 4.62*
** significant at the 0.01 level
* significant at the 0.05 level

this did not lead to any significant effect. The evidence, while being in the same direction as that reported for project 3, does not statistically support the conclusion that dysfunctional consequences are evident in the project 4 scenario.

In sum, the null hypothesis $H_0$ is rejected. Investment decisions do appear to be influenced by anticipated changes in league table position, particularly where the initial league table position is high. Consideration is now given to the issue of external validity.

## 6. External validity

It is conceivable that different categories of individuals behave in significantly different ways. Thus the use of students as the predominant recruitment background for participation in experiments has drawn general criticism of the experimental method. What can the study of 'naïve' students in an alien environment provide by way of insight into the behaviour of experienced professionals? Questions have, therefore, been raised concerning the degree of transferability of experimental results to a 'real world' environment. This section discusses the issue of external validity, briefly reviewing some of the findings reported in the academic literature and provides argument to suggest that such concerns are not warranted, given the focus of the present study.

External validity is the extent to which observed behaviour in a specific experimental setting can be transferred to more general field environments. However, a general working definition of external validity is problematic because, as Gordon, Slade and Schmitt (1987: 160) suggest, 'the standards for establishing external validity are not uniform, but rather differ with the type of research'. The issue of external validity for any experimental study, therefore, depends upon the specific circumstances and focus of the study. This is evidenced by the growing body of literature investigating the use of students as surrogates for 'professionals'.

There are a number of studies in the areas of accounting and auditing that conclude that students are not good surrogates for professionals. For example, Bouwman (1984) compares the decision-making process of 'experts' (accountants) and 'novices' (masters students) in financial analysis tasks involving the evaluation of the state of firms. While the decision-making processes of the two groups were found to be similar, experts typically transferred 'reasoning' into 'recognition'. Bouwman (1984) concluded that 'expert knowledge' and 'expert experience' were the key characteristics that distinguished between the two groups. These findings are in line with the conclusion of Dreyfus and Dreyfus (1986, p30-31), that 'experts don't solve problems and don't make decisions; they do what normally works.' The novice-to-expert learning model provided by Dreyfus and Dreyfus (1986) is further investigated by McAuley, King and Carr (1998). They report major differences in the way that novices (students) and experts (accountants) appraised a case study concerning a university. In a study of expert and novice (students) auditors Frederick (1991) reports differences between the two groups with respect to the retrieval of internal controls from memory. More generally, Gordon, Slade and Schmitt (1986) review 32 studies from the empirical literature in industrial/organisational psychology and organisational behaviour, that replicated a particular experiment using different subject groups. They conclude from the statistical evidence provided that differences existed between the behaviour observed with students and that observed with non-students.

In contrast to the results reported above, there is a body of literature that reports no significant differences in the observed behaviour between different subject groups. In a direct comparison of the internal control judgements by independent auditors and students, Ashton and Kramer (1980) report a few significant differences between the two subject groups. Despite this they conclude (p.11) that if consideration is given to 'the general directionality of the data, it appears that the students were adequate surrogates for the auditors.' Similar results are reported by Duh and Sunder (1986) and Anderson and Sunder (1992). Student participants in those experiments also responded in the same manner as professional participants, the only difference being an amplification of the results when professionals were used. In a further study, Remus (1986) reports findings of no differences in decision-making between graduate students and managers making production scheduling decisions.

From the above discussion of the empirical evidence it appears that it is not possible to draw any firm conclusions regarding the efficacy of using student surrogates in experimental scenarios. However, such a conclusion does not recognise essential differences in the classification/characteristics of the tasks employed in the above studies. Studies in the 'students are poor surrogates' group tend to elicit 'judgements' from subjects about complex, ill-defined scenarios (for example, case studies with no definitive solution), where prior experience and expertise clearly play a major role in the judgement forming process. These types of studies generally conclude that the significant characteristic difference between students (novice) and professionals (expert) is one of experience. In contrast, however, the tasks employed in studies supporting the use of student surrogates are generally simple, choice-outcome decisions that have well-defined incentive mechanisms. In such tasks there exists a transparent connection between the decision (choice) and the outcome (whether it be certain or probabilistic in nature) and experience and expertise in similar scenarios are no longer of paramount importance.

It is possible to draw the general conclusion that when novice and expert judgements are considered in complex, ill-defined tasks, students are not good surrogates for professionals. However, in simple and transparent choice-outcome tasks the issues of experience and expertise are no longer so relevant and the distinction between novices and experts is no longer as important. In these scenarios it appears students can be used as surrogates for professionals without any obvious loss of external validity. The experimental design adopted in the current study represents a simple, choice-outcome task. Participants were required to accept or reject independent project proposals, each of which had two possible paired outcomes: an improvement in both profit and league table position or a reduction in profit and a fall in league table position.

Based on the above line of reasoning the results reported in the current study are unlikely to suffer from problems of external validity and a loss of transferability to the 'real world'. In discussing the issue of external validity, Greenberg (1987: 157) suggests that 'it is not the purpose of any one study using college students to explain all that may be going on in a larger organizational context. Rather, such research may prove to be a valuable insight'. The intention of the current study was to investigate the potential dysfunctional consequences of the use of league table position as a measure of performance. To this end the study adopts a strictly controlled experimental design. The results support the conclusion that dysfunctional consequences are present and are detectable. It remains for future work to be conducted in the field, safe in the knowledge that a detectable effect exists not just theoretically, but empirically in a controlled environment.

## 7. Discussion and conclusions

In a sporting context, league tables have been used worldwide as a primary measure of success and performance evaluation. Recent years have witnessed a growing trend in the adoption of league tables as a means of assessing the performance of private and public sector organisations in the West. This is the case despite obvious differences in the circumstances surrounding the use of league tables in disparate contexts. In a sporting context the organisation under assessment is the entire entity (for example, a football team), the primary objective of which could be viewed as achieving as high a league position as possible (predominantly due to higher revenue generation in the form of prize money, sponsorship etc.). In contrast, in a business context league tables have been used to evaluate and compare the performance of sub-units of the organisation (for example, departments, stores etc.). Thus the unit under assessment is not the same in the two contexts. In a business context it is no longer obvious that the use of league tables as a means of performance assessment and as a motivational device will guarantee meeting the entity's (private or public organisation) objectives. The implications of using league tables to assess and motivate sub-units of an entity are not well understood. The investigation of a possible dysfunctional consequence of the use of league tables in such a context provides the motivation for the current study.

This paper has described a new experiment set in the context of an organisational measurement system that utilises sub-unit league tables to publicise performance based on an overall performance 'score'. Anticipated change in league table position has been shown to have an impact on decision-making behaviour over and above the effect of given financial consequences. In particular, where an opportunity exists to go to the top of the league table, individuals appear to become more risk-seeking in their behaviour. Hence, the results presented here indicate that the use of league table position as a performance indicator seems to lead to the dysfunctional consequence of 'measure fixation'. Managers of sub-units focus their attention on means of improving their unit's position in the league table. This becomes their overriding goal and affects the way in which they appraise proposals. Rather than evaluating proposals in the light of their likely impact on the organisation's objectives, managers evaluate them based on the likely impact on league table position. Proposals that may be to the detriment of the organisation's objectives (for example, projects with negative expected cash flows) may well be accepted if there is a high probability of improvement in league table position (for example, project 3). This phenomenon may be particularly prevalent in mangers of sub-units that are at, or near, the top of the league table (for example, store A). The results of this study clearly indicate that organisations must be cautious in the construction and use of such league tables in sub-unit performance assessment and motivation.

Given the potential importance of the current findings and the increasing use of league tables across both the public and private sectors,[4] additional research studies might usefully explore if the use of league tables as a performance measure leads to other types of dysfunctional consequences, and if the current results are sensitive to alterations in the organisational setting and task, changes in input data (that is, changes in the given prior probabilities and the expected financial outcomes) and alternative national and cultural settings.

## Appendix

### Experimental project sheet layout

*Project Proposal A1*

You are the general store manager of Store J. Last month Store J was ranked *second* in the performance league tables for the North Region.

You are considering whether to create some shelf space for the sale of newspapers and magazines. Potential sales income must be balanced against the direct costs of the newspapers and magazines as well as the opportunity cost of the products displaced. In addition, some customers might formally object to the store becoming 'more like a newsagent'.

The relative success of this project depends on which of two possible outcomes occur (X and Y). The impact of these outcomes is summarised below:

| | *Outcome X* | *Outcome Y* |
|---|---|---|
| Probability of occurrence: | *2/3* | *1/3* |
| Monthly financial impact of proposal: | *profit of £7,000* | *loss of £8,000* |
| Effect on overall league table position: | *move up one place to first* | *move down one place to third* |

On the basis of this information, you must decide whether you would accept or reject the proposed project. Please indicate your decision by circling the appropriate response below.

Accept Reject

## References

Anderson, M. and Sunder, S. (1992). 'Professional traders as intuitive Bayesians'. Carnegie-Mellon University, Working paper.

Argyris, C. (1952). *The Impact of Budgets on People.* New York: Ithaca.

Argyris, C. (1953). 'Human problems with budgets'. *Harvard Business Review,* (31): 97–110.

Ashton, R. H. and Kramer, S. S. (1980). 'Students as surrogates in behavioral accounting research: some evidence'. *Journal of Accounting Research,* (18): 1–15.

Beattie, J. and Loomes, G. (1997). 'The impact of incentives on risky choice experiments'. *Journal of Risk and Uncertainty,* (14): 155–168.

Beer, J. (1982). *Experiments in Psychology: A Workbook for Students.* London: Weidenfeld and Nicolson.

Beer, S. (1966). *Decision and Control,* Chichester: Wiley.

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[4] For example, the scheme outlined in the Financial Services Authority's Consultation Paper 28 is considered by Jones and Keasey (2000) to represent the beginnings of what will likely be known as the Financial Services League Tables.

Birnberg, J., Turopolec, L. and Young, S. M. (1983). 'The organizational context of accounting'. *Accounting, Organizations and Society*, (8): 111–129.

Bouwman, M. J. (1984). 'Expert v Novice decision making in accounting: a summary'. *Accounting, Organizations and Society*, (9): 325–327.

Business Intelligence (1998). *Building and Implementing a Balanced Scorecard.* London: Business Intelligence.

Cowan, P. and Morrison, H. (1996). 'The state schools book: a critique of a league table'. *British Education Research Journal*, 22 (2): 241–249.

Dreyfus, H. L. and Dreyfus S. E. with Athanasiou, T. (1986). *Mind over Machine: The Power of Human Intuition and Expertise in the Era of the Computer*, New York: The Free Press.

Duh, R. and Sunder S. (1986). 'Incentives, learning and processing of information in a market environment: an examination of the base-rate fallacy', in S. Moriarty (ed.) *Laboratory Market Research*, University of Oklahoma, Centre for Economic and Management Research.

Ezzamel, M. and Hart, H. (1987). *Advanced Management Accounting*, London: Cassel.

Fitzgerald, L., Johnston, R., Brignall, S., Silvestro, R. and Voss, C. (1991). *Performance Measurement in Service Industries*, London, CIMA.

Fitzgerald, L. and Moon, P. (1996). *Performance Measurement in Service Industries: Making it Work.* London: CIMA.

Fitzgerald, L. and Moon, P. (1997). 'Performance management in the service sector: case study evidence from the UK'. Unpublished manuscript.

Frederick, D.M. (1991). 'Auditors' representation and retrieval of internal control knowledge'. *The Accounting Review*, (66): 240–258.

Goldstein, H. and Woodhouse, G. (1988). 'Educational performance indicators and local education authority league tables'. *Oxford Review of Education*, 14 (3): 301–320.

Gordon, M. E., Slade, L. A. and Schmitt, N. (1986). 'The "Science of the Sophomore" revisited: from conjecture to empiricism'. *Academy of Management Review*, (11): 191–207.

Gordon, M. E., Slade, L. A. and Schmitt, N. (1987). 'Student guinea pigs: porcine predictors and particularistic phenomena'. *Academy of Management Review*, (12): 160–163.

Greenberg, J. (1987). 'The college sophomore as guinea pig: setting the record straight'. *Academy of Management Review*, (12): 157–159.

Hopwood, A. G. (1973). *An Accounting System and Managerial Behaviour*. Saxon House.

Jensen, R. (1976). *Phantasmagoric Accounting: Research and Analysis of Economic, Social and Environmental Impact of Corporate Business.* Studies in Accounting Research No. 14. American Accounting Association.

Jones, R. and Keasey, K. (2000). 'Financial services league tables'. University of Leeds. Working paper.

Kaplan, R. and Norton, D. (1992). 'The balanced scorecard: measures that drive performance'. *Harvard Business Review*, January-February: 71–79.

Lynch, R. and Cross, K. (1991). *Measure Up! Yardsticks for Continuous Improvements.* Cambridge: MA, Blackwell.

Magennis, S., Carey, L. and Morrison, H. (1995). 'Performance indicators and league tables: a call for standards'. *Higher Education Quarterly*, 49 (2): 128–145.

McAulay, L., King, M. and Carr, C. (1998). 'Expertise and learning: an alternative perspective on the theory-practice debate'. *British Accounting Review*, (30): 173–200.

Moon, P. and Fitzgerald, L. (1996). 'Delivering the goods at TNT: the role of the performance measurement system'. *Management Accounting Research*, (7): 431–457.

Olshavsky, R. (1979). 'Task complexity and contingent processing in decision-making: a replication and extension'. *Organizational Behavior and Human Performance*, (24): 300–316.

Payne, J. (1976). 'Task complexity and contingent processing in decision-making: an information search and protocol anaysis'. *Organizational Behavior and Human Performance*, (16): 366–387.

Pratt, T. (1996). 'League table games'. *Investment Dealers Digest*, 62 (25): 12–17.

Remus, W. (1986). 'An experimental test of the use of graduate students as surrogates for managers in experiments in business decision-making'. *Journal of Business Research*, 14: 20–30.

Smith, P. (1995). 'On the unintended consequences of publishing performance data in the public sector'. *International Journal of Public Administration*, 18 (2/3): 277–310.

Thaler, R. and Johnson, E. (1990). 'Gambling with the house money and trying to break even: the effects of prior outcome on risky choice'. *Management Science*, 36 (6): 643–660.

Tversky, A. (1969). 'Intransitivity of preferences'. *Psychological Review*, (76): 31–48.

Wilson, R. and Chua, W. (1993). *Managerial accounting: method and meaning.* London: Chapman and Hall.

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# Incentives and disincentives for voluntary disclosure by pension funds: international evidence

**Paul J.M. Klumpes***

**Abstract**—This paper examines competing proprietary and political cost arguments for incentives facing managers of different types of Australian and UK pension fund, to voluntarily disclose pension liability information in annual reports sent to their participants. For Australian defined benefit pension funds, the disclosure reveals the fund's actuarial surplus or deficit, which conveys information to participants about the pension fund's ability to generate future cash flows. Tests are conducted on the voluntary reporting practices of a sample of 119 Australian and 100 UK pension funds, using variables which prior research suggests affects their financial valuation and performance. The empirical results support predictions that managerial discretionary disclosure carries proprietary cost implications for Australian defined benefit pension funds, as proxied by their investment risk and funding ratio, and political cost implications for Australian defined contribution and UK defined benefit pension funds, as proxied by their size. *Keywords*: pension funds, voluntary disclosure, proprietary costs. *Classification codes*: D82, G22, J41.

## 1. Introduction

Pension funds are increasingly attracting worldwide attention by public policy makers as a means of facilitating privately-funded retirement income savings by an ageing workforce (World Bank, 1994). In addition to directly affecting the financial retirement planning decisions of a large and diffuse set of participants, pension funds are now among the most important institutional investors in many capital markets. But in contrast to the relatively established body of securities and corporations legislation that regulates the corporate governance and accountability of publicly held corporations to their shareholders (including applicable generally accepted accounting principles or GAAP), until recently pension funds were relatively unregulated in most Anglo-American countries. Rather, their financial management and control is subject to general trust law principles and thus critically depends on the expertise of appointed trustees and their delegated financial managers (Fama and Jensen, 1983).

Alternative methods available in these countries to finance private sector employees' pension benefits also significantly affect their level of financial accountability. Defined benefit pension funds (where employers commit to pay future uncertain benefits to their employees, based on final salary and years of service) differ from defined contribution pension funds (where benefits are based on accumulated contributions made by employers and/or employees and are, by definition, fully funded).

Historically, pension accounting practices in Anglo-American countries have reflected a legalistic, explicit contract view of pension contracts, which implied that actuarial-based obligations for prior service costs do not accrue to a sponsoring employer of a defined benefit pension fund as accounting liabilities. However, this perspective was challenged in the US by the development of economic theory, largely sanctioned by government legislation (the *Employee Retirement and Income Security Act of 1974*), concerning the importance of valuing implicit pension contract rights within the employee compensation package. This in turn led to the promulgation of US accounting standards that attempted to standardise the measurement and recognition of the annual, periodic difference ('deficit' or 'surplus') between pension funds assets (based on market value) and actuarially-determined pension liabilities (based on present value, discounted using market rates) in the accounts of both employer sponsors (SFAS 87, *Employer Sponsors' Accounting for Pension Costs*) and pension funds (SFAS 35, *Accounting by Defined Benefit Pension Plans*).

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By contrast, while pension rights are also now legally regarded as implicit contracts under current legislation in both Australia (*Superannuation Industry Supervision Act*, 1993) and the UK (*Pensions Act*, 1995), the associated pension obligation is not recognised in the financial statements on a standard annualised basis. Instead, pension obligations are valued by actuaries on a triennial basis, using various methods and assumptions. These figures are disclosed by way of footnote to the accounts of the employer sponsor (under AASB 1028 *Accounting for Employee Retirements* and SSAP 24 *Accounting for Pension Costs* respectively). Moreover, while the equivalent figure must also now be disclosed by Australian pension funds (under AAS 25 *Financial Reporting by Superannuation Plans*, effective 30 June 1993), it need not be disclosed by UK pension funds (under the Revised SORP 1, *Financial Reports of Pension Schemes*, effective 6 April 1997).

The differential accounting treatment of pension obligations, both in terms of both its non-recognition on a standardised, annual basis (Australia and the UK, *vis à vis* the US) and as between the employer sponsor and pension funds (the UK, *vis à vis* Australia), reflect implicit trade-offs made by accounting standard setters in these countries between the perceived relevance and reliability of these figures to their potential users (i.e. employee participants). These differences seem anomalous, given new proposals by both the International Accounting Standards Committee and the Accounting Standards Board that require employer sponsors to recognise pension liabilities (Exposure Draft 54 and FRED 20, respectively).

The purpose of this paper is to examine what incentives faced by managers of defined benefit and defined contribution pension funds in both Australia and the UK caused them to voluntarily disclose pension plan asset and liability information in annual reports sent to employee participants, after pension legislation was enacted, but before these accounting standards (i.e. AAS 25 and the Revised SORP 1) became fully effective. In addition to uncovering new evidence about factors affecting managerial discretion over voluntary disclosures made to a much larger, but more diffuse set of financial statement users than shareholders, this paper makes two contributions to the extant (mostly-US-based) literature on managerial pensions-related discretionary behaviour.[1] First, while prior studies assume that the employer sponsor's shareholders effectively own pension fund assets and liabilities, this study more realistically acknowledges that, consistent with case law and pension legislation recently enacted in both Australia and the UK, employees may have a legal claim over a portion of the pension fund surplus. Second, this study examines discretionary behaviour in settings with lower disclosure thresholds (Australia and the UK), and are expected to systematically differ between both (i) defined benefit or defined contribution funds operating in the same institutional environment (Australia); and (ii) defined benefit funds operating in different settings (Australian versus the UK).

Two alternative disclosure theories explain voluntary disclosure incentives by Australian and UK pension fund managers. First, Verrecchia's (1983) proprietary cost theory implies that the threshold level of disclosure is measured in terms of news favourableness and proprietary cost. These effects are offsetting, so that the incentive not to disclose is increasing in the size of proprietary costs, resulting in the disclosure of only more favourable news. Thus, the probability of a manager disclosing information is negatively associated with the proprietary costs attached to the disclosure, and is positively associated with the favourableness of the news in the disclosure. Alternatively, the 'political costs' hypothesis implies that managers' incentives to voluntarily report pension fund financial information to participants was affected by political costs of making the disclosure, since the adequacy of laws governing the financial accountability of pension funds in both Australia and the UK was subject to intense political scrutiny. Neither of these theories has previously been used to explain managerial discretion over pension fund finanical reports sent to participants.[2]

Voluntary financial reporting by Australian pension funds to their participants during the period 1991-1992 and UK pension plans in 1995-1996 is suitable for testing these disclosure theories for a number of reasons. First, prior to the subsequent enactment of relevant legislation to mandate their financial reporting, pension plans were not obliged to send financial reports to their participants. Second, there were political threats to regulate pension fund financial reporting during this period (Klumpes, 1993).[3] Third, Cramer and Neyhart (1980) show that pension fund financial information is potentially value-relevant to fund participants. Fourth, this information is also potentially value-relevant to the sponsoring firm's shareholders, which has proprietary cost implications.[4]

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[1] Prior US-based empirical studies have examined the voluntary disclosure of defined benefit pension fund information by employers (e.g. Scott, 1994), their pension funding and termination strategies (e.g. Thomas, 1989; Stone, 1991), and the stock market's valuation of their pension assets and liabilities (e.g. Daley, 1984; Dhaliwal, 1986; Landsman, 1986; Barth, 1991; Barth et al., 1992; Ang et al., 1999).

[2] Scott (1994) examines the voluntary disclosure of defined benefit pension fund asset and liability information by a sample of 288 Canadian firms in 1987. Consistent with the implications of Verrecchia's (1983) proprietary cost theory, he finds that the disclosure is mitigated by both proprietary cost and news favourableness effects. However, Scott (1994) does not examine what incentives face managers to disclose such information to their participants or if those same incentives also apply to non-corporate sponsored pension funds.

This study develops testable hypotheses and empirical surrogates for both the proprietary and political cost implications of the voluntary disclosure decision. It is hypothesised that voluntary disclosure incentives are driven primarily by proprietary costs facing Australian defined benefit pension fund managers, and by political costs for managers of both Australian defined contribution pension funds and UK defined benefit pension funds. These competing theoretical explanations are tested by developing empirical proxies for both proprietary costs (fund's investment risk and investment returns), and political costs (fund size, funding ratio and expense ratio).

The empirical data set comprises voluntary financial reporting and financial characteristics of random samples of 119 Australian (55 defined benefit and 64 defined contribution) and 100 UK (defined benefit) pension funds. Consistent with the proprietary cost theory, Australian defined benefit pension funds incurring higher operating costs, higher funding ratios and higher investment risk voluntarily adopted the general purpose financial reporting provisons of AAS 25. Consistent with the political cost hypothesis, larger Australian defined contribution pension funds voluntarily adopted AAS 25, and larger UK defined benefit pension funds voluntarily adopted the Revised SORP 1.

The rest of this paper is organised as follows. Section 2 provides the institutional background for explaining voluntary disclosure by Australian and UK pension fund managers, when alternative financial reporting formats were available. Section 3 outlines the theoretical antecedents, and Section 4 develops the disclosure hypotheses. Section 4 describes the research model, while Section 5 reports the results of empircal tests. Finally, Section 6 provides a summary and conclusion.

## 2. Institutional background

Pension fund accounts in both Australia and the UK were previously based on industry-developed financial reporting guidelines (hereinafter 'IRG'). Both the Australian and UK pension industries first developed IRG for annual reporting to participants in 1986 (Klumpes, 1994b). Under IRG, the present value of future accrued pension obligations payable to employee participants ('accrued benefit obligation', hereinafer 'ABO') is deemed as being an actuarial calculation and thus need not be reported to participants.

IRG are in most respects identical to AAS 25—except that pension fund managers were not required to report the plan's net surplus or deficit (of assets over the accrued benefits they were obliged to transfer in the future to members and beneficiaries). Similarly, although the Revised SORP 1 did not require UK pension fund managers to disclose pension liabilities, it contained significantly more detailed disclosure of pension liability assumptions and of pension assets than that required by IRG. Since both AAS 25 and the Revised SORP 1 were not effective for over a year after they were issued, some pension fund managers faced an incentive to voluntarily use IRG during this transitional period (1991-92 in Australia; 1996-7 in the UK).

Compared to the Revised SORP1, AAS 25 requires both defined benefit and defined contribution pension funds to disclose their ABO, thus revealing their periodic net surplus or deficiency. However, the Australian pension industry actively lobbied against AAS 25 on the grounds that the recognition of the ABO would only serve to 'confuse and mislead' participants, and that disclosing the net surplus or deficit would cause pension fund managers to adopt more conservative investment and funding strategies.[5] The industry's views were later endorsed by the industry's regulator, the Insurance and Superannuation Commission (ISC), which subsequently issued regulations in mid-1992 that were based on IRG, mandating the disclosure of abbreviated statements of pension fund net assets and changes in net assets in annual financial reports sent to participants (Klumpes, 1994b). These regulations applied for reporting periods ending on or after 30 June 1993, the same date at which AAS 25 became effective. Table 1 summarises the major conceptual differences between AAS 25, the Revised SORP and IRG which are relevant to this study.

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[3] Klumpes (1993) contains a comprehensive discussion of the implications arising from the Maxwell fiasco for the subsequent reform of laws regarding the financial accountability of Australian pension funds.

[4] Ang et al. (1999) investigate the value relevance of pension disclosures as required by AASB 1028 by samples of 51 industrial and 81 Australian firms during 1994–1995. They find that market participants view pension assets and liabilities as being value relevant to the sponsoring industrial firm. Since AASB 1028 was not issued until 1994 (and was not effective until 30 June 1995), pension liability information disclosed voluntarily by defined benefit pension plan managers under AAS 25 was also potentially value-relevant to other users (investors) during this earliest period.

[5] Ang et al. (1999) cite evidence that the recognition and measurement proposals for employer sponsors' pension liabilities also met with vigorous opposition, particularly from employers sponsoring defined benefit pension plans (Lambert and Gallery, 1996).

Empirical research (Anderson and Sharpe, 1992, Klumpes, 1994a and Herbohn and Buchan, 1995) have surveyed the level of voluntary compliance with AAS 25 by samples of pension funds during 1991-92, by distinguishing between 'partial' (pension funds voluntarily adopting IRG) and 'full' compliance (pension funds adopting AAS 25). The results of these studies generally find a low level of full compliance with AAS 25 by defined benefit funded pension funds, but a much higher level of full compliance by defined contribution funded pension funds. These results are intuitively plausible. The latter are by definition fully funded at any point in time, since their ABO always equals the fair market value of their net assets. Thus (ignoring incremental information production and related expenses of management associated with implementing the standard) full compliance with AAS 25 is relatively costless to defined contribution funds. By contrast, the task of merely calculating the funding for defined benefit pension funds is more costly and complex, and therefore resulted in a lower level of compliance with AAS 25. Moreover, since the ABO is largely funded by a third party (the employer sponsor) and is not a verifiable, known value but is based on an actuarial estimate, it will rarely, if ever, exactly equal the fair market value of assets. Due to actuarial discretion over the assumptions underlying the ABO, the resulting volatility in the reported surplus or deficit level is also susceptible to earnings management behaviour by the employer sponsor (Fogarty and Grant, 1995).

For UK pension funds, Klumpes and Manson (2000) find a relatively higher level of full compliance with the Revised SORP 1 by UK defined benefit pension funds. These results are intuitively plausible since, unlike AAS 25, their ABO need not be reported under the Revised SORP 1. The next section develops this insight into more detailed proprietary and political cost explanations for the observed variation in the propensity of various types of pension fund managers to voluntarily disclose the ABO.

## 3. Theoretical antecedents

Scott (1994) reviews the testable implications of Verrechia's (1983) proprietary cost theory, in which the threshold level of disclosure is measured in the favourableness of news and is increasing in proprietary cost. These effects are offsetting, so that the incentive not to disclose is increasing in the size of proprietary costs, resulting in the dis-

**Table 1**
**Alternative financial reporting standards available to Australian and UK pension funds**

| | *'Financial Reporting by Superannuation Plans' (AAS 25)* | *'Financial Reporting by Pension Schemes' (Revised SORP1)* | *Industry Recommended Guidelines (IRG)* |
|---|---|---|---|
| Issuing authority | Issued by Australian Accounting Research Foundation on behalf of the Australian Accounting Standards Board | Pensions Research Accounting Group | Pension industry (Australia), Accounting Standards Committee (UK) |
| Form of standard | Australian Accounting Standard AAS 25 | Revised Statement of Recommended Practice (1996) | Schedule 8 to Occupational Superannuation Standard Regulations (1991) (Australia), Statement of Recommended Practice (1996) (UK) |
| Issue date | 1990, revised 1992 and in 1993 | 1996 | 1991 (Australia) 1986 (UK) |
| Effective date | Reporting periods ending from 30 June 1993. (revised from 30 June 1992) | Reporting periods ending on or after 6 April 1997 | Reporting periods ending from 30 June 1993 (Aust). Reporting periods ending after 6 April 1987 (UK) |
| Financial reports to be produced | Operating statement of financial position<br>Cash flow statement | Fund account<br>Net assets statement | Statement of net assets (Aust. and UK); Statement of changes in net assets available to pay benefits; Revenue account (UK) |

closure of only more favourable news. Thus, the theory divides into two general hypotheses. First, the probability of disclosing information is negatively associated with the proprietary costs attached to the disclosure; second, it is positively associated with the favourableness of the news in the disclosure.

Verrecchia's (1983) proprietary cost theory has testable implications for explaining voluntary disclosure incentives facing firms whenever information is value-relevant and proprietary costs are important. However, it does not bear directly upon settings where equivalent disclosures are made by entities not potentially exposed to proprietary costs, such as not-for-profit or mutual organisations. Lim and McKinnon (1993) examine voluntary disclosure practices of 50 commercial and semi-commercial statutory authorities in the Australian State of New South Wales in 1984. They hypothesise that, compared to authorities with low political visiblity, authorities with high political visibility will voluntarily disclose more information of a 'non-sensitive nature', but will not disclose more information of a 'sensitive' nature. Their results are consistent with these hypothesised relations. However, Lim and McKinnon (1993) do not define precisely 'sensitive information disclosure' or describe its consequences, noting only that it is financial in nature and 'attracts favourable attention and questions which may lead to the imposition of political costs'.[6]

## 4. Hypothesis development

In this section, we make predictions about the relation between observed voluntary disclosure practices and voluntary incentives faced by managers of Australian and UK pension funds. The discretionary disclosure decision facing Australian pension fund managers during 1992 and facing UK pension fund managers during 1996 is of interest to this study because it signals their sensitivity to either political scrutiny or to the presence of a fund-specific proprietary cost, which may explain a voluntary disclosure policy when a new disclosure rule presents itself. The proprietary and political cost explanations propose that Australian pension fund managers of both types of pension fund may face either incentives or disincentives to voluntarily adopt AAS 25, but for potentially different reasons. Hypotheses are developed separately for proprietary costs and political costs.

### *4.1. Proprietary cost hypothesis*

Defined benefit pension fund managers electing to comply fully with AAS 25 face a trade-off between the news favourableness of disclosing the reported net surplus or deficit and the potential proprietary costs associated with making this disclosure. This is because it conveys future cash flow information about the sponsoring firm's ability to manage its future contractual commitments to pay pension benefits (based on the fund's current investment, funding and other operating conditions). Thus, a proprietary cost to defined benefit pension fund managers of voluntarily adopting AAS 25 is that the fund's net surplus or deficit, which may be sensitive to minor fluctuations in investment or funding policy, must be reported to pension fund participants. Scott (1994) develops surrogates for proprietary costs which indicate that the presence of certain pension fund financial characteristics, such as underfunding, a risky investment strategy and high levels of expenses, reveals the presence of a proprietary cost—the cost of controlling the size of the pension fund surplus/deficit—which is then influential in setting a pension fund disclosure policy when a new disclosure rule presents itself.

This information has proprietary cost implications for managers of Australian defined benefit pension funds because full compliance with the ABO reporting provisions of AAS 25 is potentially value-relevant to both participants and other financial statement users. Indeed the presence of proprietary costs might well have motivated managers to lobby against the controversial standard. Similarly, proprietary costs may explain strenuous efforts made by defined benefit pension fund sponsors to oppose subsequent efforts to impose equivalent measurement and recognition criteria for employer sponsors' pension liabilities (Lambert and Gallery, 1996; Ang et al., 2000).

On the other hand, managers of Australian defined contribution pension fund managers are unlikely to face any proprietary costs associated with the disclosure decision, since employer sponsors are not liable for funding future, uncertain pension benefits payable to participants. Similarly, since UK defined benefit pension fund managers are not required to disclose the ABO, their voluntary compliance with the Revised SORP 1 does not convey potentially value-relevant information. The proprietary costs hypothesis is stated (in alternative form) as follows:

**H1a:** The probability of an Australian defined benefit (Australian defined contribution) pension fund manager voluntarily adopting AAS 25 decreases with (is unaffected by) its proprietary cost implications.

**H1b:** The probability of a UK defined benefit pension fund manager adopting the Revised SORP 1 is unaffected by its proprietary cost implications.

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[6] Observed financial reporting practices by Australian public sector entities were affected by their political visibility (Lim and McKinnon, 1993).

### 4.2. Political costs hypothesis

During the period 1991-2, three separate politically-motivated public enquiries were conducted into the adequacy of pension plan accountability (Klumpes, 1993). As is argued below, such issues are more likely to be significant for defined benefit pension funds. However, managers who elect not to disclose it may be exposed to greater political scrutiny by the media or government threats of regulatory intervention. It is hypothesised that defined contribution pension funds with high political visibility would be more likely to voluntarily adopt AAS 25 than those with low visibility. It is also argued that a similar relationship holds for UK defined benefit pension funds in their decision to voluntarily comply with the Revised SORP 1.

However, such trade-offs are unlikely to arise for Australian defined benefit pension funds. Anecdotal evidence suggests the few defined benefit pension funds that voluntarily adopt AAS 25 suffered unfavourable political attention due to a misunderstanding about its financial impact (Walker, 1991).[7] Pressure groups representing a large number of Australian defined benefit pension funds (The Association of Superannuation Funds) and their professional advisers (the actuarial profession) actively opposed AAS 25. Even when they failed to block the standard, they subsequently persuaded the ISC to adopt IRG as the basis of legislation mandating pension fund financial reporting (Klumpes, 1994a). Since political agenda-building activities by these pressure groups succeeded in publicising their views and securing access to government regulators, it is unlikely that individual defined benefit pension fund managers' subsequent voluntary disclosure decision (whether or not to fully comply with AAS 25) would have had any political cost implications. The political costs hypothesis is:

**H2**: The probability of an Australian defined contribution or UK defined benefit (Australian defined benefit) pension fund manager voluntarily adopting IRG increases with (is unaffected by) their political costs implications.

## 5. Method

### 5.1. Sample selection

Representative samples of pension fund participant financial reports were selected by reference to the underlying population of Australian pension funds that were identified by an Insurance and Superannuation Commission (1994) census as being subject to mandated reporting rules, effective on 30 June 1993. Australian pension funds considered eligible for inclusion in the study were those subject to the *Superannuation Industry Standards Act 1994* (total assets exceeding A$1m. or having more than four active participants). Identical sample selection criteria were applied to UK pension funds.

A sample of 150 pension funds was randomly selected from the 1992 edition of *The Blue Book*, an annual professional publication listing names and contact addresses of approximately 1,500 Australian pension funds. This publication is widely distributed throughout the Australian pension industry and thus was considered to be representative of the wider population Australian pension funds. Each pension fund manager was asked to supply a copy of their 1991-92 annual financial report sent to participants. A similar procedure was employed to identify an equivalent number of UK pension funds. They were selected from the 1995 edition of *Pension Funds and Their Advisers*.

A total of 119 (80%) Australian and 100 (67%) UK pension funds supplied annual reports. Of the Australian sample, 54 were defined benefit funded and 65 were defined contribution funded. For control purposes, only defined benefit pension funds were selected for inclusion in the study. A review of non-respondent pension funds indicated that the financial and operating characteristics were similar to those of the final sample.

### 5.2. Measurement of information disclosure

Voluntary disclosures were examined on the basis of whether or not a pension fund financial report sent to participants disclosed a net surplus or deficit. This was examined for annual reports sent by sample pension funds to their participants in the last year prior to the mandating of pension fund financial reports, namely the year ended 30 June 1992 (for Australian funds) and the year ended 5 April 1996 (for UK funds). A dichotomous variable, *FRS*, was used. This dichotomous variable was considered to be appropriate for the Australian sample because managers electing to use AAS 25 must prepare financial reports which incorporate the pension fund's periodic surplus or deficit, information which Scott (1994) suggests is potentially value relevant to both investors and employees of the sponsoring firm. The same dichotomous variable was used to identify UK pension funds which prepared financial statements in accord with the Revised SORP 1. The dummy dependent variable indicates whether the pension fund managers adopt (=1) or do not adopt (=0) *FRS* during the study period.

### 5.3. Development of empirical proxies for proprietary costs (Australian funds)

This sub-section introduces various empirical proxies for proprietary and political costs which

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[7] Walker (1991) discusses the intense political scrutiny of Australia's largest pension plan, the State Authorities Superannuation Board of New South Wales, after it voluntarily disclosed a large unfunded net deficit in accordance with AAS 25 in March 1991.

Klumpes and McCrae (1999) find have potentially non-trivial cash-flow effects on a pension fund's valuation and financial performance, and thereby potentially affect its manager's voluntary disclosure decision. The first three independent variables, *FUNDR, INVRISK* and *INVRTN,* are intended to capture proprietary costs related to the pension fund's ability to insure participants against various sources of retirement income risk (Bodie, 1990). Prior US-based empirical studies (Thomas, 1989; Stone, 1987) show that defined benefit pension fund investment and funding policies are subject to incentive conflicts between the employer sponsor and the participants. According

**Table 2**
**Descriptive statistics: sample and population of Australian and UK pension funds**

This table summarises descriptive statistics for Australian defined contribution pension funds (panel A), Australian defined benefit pension funds (panel B), and for UK defined benefit pension funds (panel C), for both the sample and population. Statistics are for the year ended 30 June (1992) (Australia) or 5 April 1997 (UK).

*Panel A: Australian Defined Benefit Funds (Population N=3,209; Sample N=54)*

| | Population Mean | *Sample* | | | |
|---|---|---|---|---|---|
| | | *Mean* | *Min.* | *Max.* | *Std Dev.* |
| *EXPENSE* | 1.25 | 0.39 | 0.00 | 6.12 | 0.78 |
| *INVRTN* | 6.29 | 6.95 | −4.89 | 8.82 | 4.81 |
| *INVRISK* | n.a. | 73.81 | 16.44 | 99.69 | 14.08 |
| *FUNDR* | n.a. | −0.01 | −0.40 | 0.52 | 0.12 |
| *SIZE* | 34.7 | 390 | 4.11 | 3,485 | 655.60 |

*Panel B: Australian Defined Contribution Benefit Funds (Population Size N=1,370; Sample N=65)*

| | Population Mean | *Sample* | | | |
|---|---|---|---|---|---|
| | | *Mean* | *Min.* | *Max.* | *Std Dev.* |
| *EXPENSE* | 2.01 | 0.82 | 0.01 | 5.00 | 0.95 |
| *INVRTN* | 6.25 | 7.63 | 0.00 | 20.34 | 4.05 |
| *INVRISK* | n.a. | 62.33 | 0.00 | 100.00 | 28.70 |
| *FUNDR* | n.a. | 0.06 | 0.06 | 0.85 | 0.21 |
| *SIZE* | 28.09 | 112 | 1.19 | 887 | 161.1 |

*Panel C: UK Defined Benefit Funds (Population N=1,400; Sample Size N=100)*

| | Population Mean | *Sample* | | | |
|---|---|---|---|---|---|
| | | *Mean* | *Min.* | *Max.* | *Std Dev.* |
| *EXPENSE* | n.a. | 0.39 | 0.00 | 11.70 | 1.27 |
| *INVRTN* | n.a. | 16.40 | 0.00 | 34.95 | 4.33 |
| *INVRISK* | 83.2 | 86.35 | 0.00 | 100.00 | 15.28 |
| *FUNDR* | n.a. | 0.03 | −0.06 | 0.33 | 5.05 |
| *SIZE* | 192.1 | 750 | 1.00 | 22,287 | 2,687.7 |

*EXPENSE* is the sum of all operating expenses, excluding taxes, as a percentage of net assets of the pension fund as at 30 June 1992.
*INVRTN* is the sum of realised and unrealised gross income earned by the pension fund for the year ended 30 June 1992, expressed as a percentage of total assets of the pension fund as at 30 June 1992.
*INVRISK* measures the level of investment risk exposure involved in a pension fund manager's strategic long-term allocation policy, defined as the total investment portfolio (allocated to professional fund managers) that did not comprise cash or cash-equivalent assets (e.g: stocks, property) as at 30 June 1992.
*FUNDR* is the ratio of total contributions received, plus investment returns earned (net of expenses), less total benefit payments made over the three years ended 30 June 1993, divided by total net assets of the fund over three years ended 30 June 1993.
*SIZE* measures the market value of total assets of a pension fund in A$ or £m, as at 30 June 1992.

to the proprietary cost hypothesis, the probability of defined benefit pension fund managers voluntarily using AAS 25 decreases for those with relatively low funding ratios, high levels of investment return or relatively non-liquid or 'risky' investments.

*FUNDR* is the pension fund's funding ratio, and indicates the funding status of the pension fund. Standard measures of pension funding ratios used in prior empirical accounting research studies (Tinker and Ghicas, 1993) are based on the stock relationship of known pension assets less pension liabilities, divided by pension liabilities. However, this ratio is not appropriate to this study for a number of reasons. First, pension liabilities (represented by the ABO) are only available for defined benefit pension funds which voluntarily disclose this figure during the study period. Second, this figure is meaningless for defined contribution pension funds, which by definition are fully funded (on a full accrual accounting and going concern basis).

In this study, *FUNDR* is measured as an alternative 'flow' relationship of annual contributions received, plus investment returns earned (net of expenses), less annual benefit payments. This is then scaled by total fund net assets for the relevant period to derive comparable ratios across the sample. Mitchell and Smith (1994) suggest that this alternative flow measure has the advantage of avoiding the artificiality induced by managerial 'smoothing' of actuarial assumptions underlying the assets and liabilities. To reduce the sensitivity of this variable to periodic 'contribution holidays' by the employer sponsor or other growth effects, it is averaged for the three years ended 30 June 1993. Poorly funded defined benefit pension funds are more likely to be sponsored by highly leveraged and unprofitable employer firms (Bodie et al., 1987), or to be voluntarily terminated by the employer sponsor (Stone, 1991)

*INVRISK* is a proxy for the reputation-related risk that the pension fund's investment portfolio might be invested inappropriately by the financial intermediary from the pension fund's viewpoint (e.g. investing in non-liquid securities that cannot be used to fund current benefit payments). It measures the percentage of pension fund total assets that comprised classes of risky assets (eg: fixed interest securities, stocks, property), as at 30 June 1992, that are not available to fund benefit payments for the year ended 30 June 1992. Pension funds which invest in more risky assets are likely to be sponsored by less reputable employer firms (Bodie et al., 1987).

*INVRISK* is a proxy for the risk that the pension fund's investment portfolio might be invested in 'risky' assets from the pension fund participant's viewpoint (e.g.: equities, property) (Amir and Benartzi, 1998). Fama and Jensen (1983) claim that investment is influenced by the ability to expand and contract the portfolio at least cost (i.e. via cash or cash-convertible securities). Jeffrey (1983) similarly notes that most pension funds are concerned with the likelihood of having sufficient cash with which to make future expected benefit payments. US pension funds invested approximately 37% of their assets in cash or cash equivalents in 1993 (Logue and Rader, 1998, 109).

Consistent with this conceptualisation, *INVRISK* is measured as the level of investment risk exposure involved in a pension fund manager's strategic long-term asset allocation policy, defined as the total investment portfolio (allocated to professional fund managers) that did not comprise non-cash or cash-equivalent assets as at 30 June 1992. The Australian pension industry pressure groups (most members of which were trustees of or professional advisers to defined benefit pension funds), opposed AAS 25 on the grounds that its adoption would cause pension fund managers to adopt more cautious investment policies in order to minimise variation in the net surplus or deficit (AAS 25 requires all pension fund assets to be marked-to-market). Thus, managers of defined benefit pension funds with relatively low investment risk face relatively lower proprietary costs in using AAS 25.

*INVRTN* measures in percentage terms total realised and unrealised gains or losses on pension fund investment, divided by net fund assets, for the year ended 30 June 1992. *INVRTN* is considered to have proprietary cost implications. Defined benefit pension fund managers who generate relatively higher returns earned on the pension fund portfolio for a given level of risk exposure are more likely to meet future cash outflow obligations, and consequently less likely to face proprietary costs in exercising discretion to voluntarily adopt the pension liability reporting provisions of AAS 25.

### *5.4. Development of empirical proxies for proprietary costs (Australian and UK funds)*

A standard proxy for political costs used by prior empirical accounting studies has been size. However, although size has been found to be an important factor in explaining accounting policy choice, Lim and McKinnon (1993) caution against the unquestioning acceptance of firm size as a proxy for political visibility.[8] While interpreting size is problematic, Scott (1994) notes that it must be included as a control because of its demonstrated association with disclosure as a political cost proxy. *SIZE* measures the market value of total assets of a pension fund in A$m. as at 30 June 1992. For the combined Australian (UK) sample, pension fund assets varied from A$4 (£1) m. to A$3,485 (£750)m. In the statistical tests the *SIZE* variable is converted to log scale.

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[8] Lim and McKinnon (1993, 200) cite prior authorities (Zmijewski and Hagerman (1981: 147), Ball and Foster (1982: 182) and Holthausen and Leftwich (1983: 108)) who caution against the unquestioning acceptance of firm size as a proxy for political visibility, and note that Watts and Zimmerman (1990: 152) have stressed the importance of developing more precise proxies for political costs.

In addition to the traditional size proxy, the pension fund's expense ratio (*EXPENSE*) is used to measure the political costs faced by Australian and UK defined contribution pension funds during the relevant study period (the higher the ratio the higher the costs). By contrast, Bodie (1990) notes that a defined benefit pension fund's expense ratio is likely to be subsidised by the employer sponsor's payroll system. Consequently, the expense ratio is less likely to be politically visible for managers of these types of fund, irrespective of their institutional setting.

*EXPENSE* is measured as the sum of all operating expenses, excluding taxes, as a percentage of net assets of the pension fund as at 30 June 1992.[9] During the study period, political inquiries investigated alleged poor management practices of some types of pension fund as reflected by relatively high expense levels (Klumpes, 1994a). Consequently, for political visibility reasons, the propensity of the manager to report the pension fund's net surplus or deficit is posited to be negatively related to the level of expenses incurred by the fund.

### 5.5. *Descriptive statistics*

For the sample pension funds and for all Australian pension funds in 1991-92, Table 2 reports a comparison of the mean size, expense and income ratios (as percentages of total fund assets). These are shown separately for the Australian defined benefit fund (Panel A) and defined contribution fund (Panel B) samples, and the UK defined benefit fund sample (Panel C). Tests of sample representativeness were not conducted because neither of the sample are normally distributed and because comparable population means are not readily available for Australian and UK samples for at least some of the explanatory variables (as discussed below).

**Table 3**
**Correlations among independent variables**

| *Variables* | *EXPENSE* | *LNSIZE* | *INVRTN* | *INVRISK* | *FUNDR* |
|---|---|---|---|---|---|
| *Panel A: Australian Defined Benefit Pension Funds* | | | | | |
| *EXPENSE* | 1.00 | — | — | — | — |
| *LNSIZE* | $-0.32^{b}$ | 1.00 | — | — | — |
| *INVRTN* | 0.05 | 0.07 | 1.00 | — | — |
| *INVRISK* | $-0.18^{b}$ | −0.11 | 0.04 | 1.00 | — |
| *FUNDR* | 0.06 | −0.14 | $0.17^{b}$ | 0.09 | 1.00 |
| *Panel B: Australian Defined Contribution Pension Funds* | | | | | |
| *EXPENSE* | 1.00 | — | — | — | — |
| *LNSIZE* | 0.04 | 1.00 | — | — | — |
| *INVRTN* | −0.02 | −0.03 | 1.00 | — | — |
| *INVRISK* | 0.14 | $-0.19^{b}$ | 0.03 | 1.00 | — |
| *FUNDR* | $0.27^{a}$ | $0.21^{b}$ | $-0.31^{a}$ | −0.15 | 1.00 |
| *Panel C: UK Defined Benefit Pension funds* | | | | | |
| *EXPENSE* | 1.00 | — | — | — | — |
| *LNSIZE* | −0.05 | 1.00 | — | — | — |
| *INVRTN* | −0.06 | 0.06 | 1.00 | — | — |
| *INVRISK* | −0.04 | −0.04 | $0.18^{c}$ | 1.00 | — |
| *FUNDR* | $-0.18^{c}$ | $-0.22^{b}$ | 0.07 | 0.01 | 1.00 |

*Notes: LNSIZE* is the natural log of *SIZE*. Other variables are as defined in Table 3. a<0.01, b<0.05. The Table contains product-moment (Pearson) correlation coefficients.

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[9] The level of expenses incurred by a professional manager of a delegated investment portfolio (such as pension funds or mutual funds) is sometimes referred to as the intermediary 'spread', or difference between the rates of return on a mutual fund's portfolio and the amount made available to retail investors. Brennan (1995) cites evidence that this quantity, although apparently a small proportion of total managed assets, can be economically very significant to retail investors and to pension fund participants, when deducted from reported income.

For the Australian samples, fund size (*SIZE*) and income (*INVRTN*) for the sample pension funds exceed those for the population, and the expense ratio (*EXPENSE*) is smaller. These findings are expected, as larger pension funds incur lower expense ratios. *SIZE* is relatively higher for defined benefit pension funds, reflecting that they are relatively more established. By contrast, while *INVRTN* is about the same, *EXPENSE* differs noticeably, since many employer sponsors subsidise the cost of operating defined benefit funds.

Relative to the equivalent Australian defined benefit pension fund sample, UK pension funds are larger (reflecting their relative maturity). They also earned substantially higher investment returns over the period 1995-96 than did the Australian funds during 1991-2. There are a number of possible sources of this variation. First, returns on most risky asset classes were substantially higher for pension funds in the latter period, due to the worldwide recovery of asset prices following the Gulf War and associated recession. Second, UK pension funds are relatively more exposed to risky asset classes, such as equities, than their Australian counterparts (as reflected by *INVRISK*), which would magnify the periodic differences in average return.

Table 2 also reports descriptive statistics for the *INVRISK* and *FUNDR* for both types of fund, for which comparable population means are not readily available. *FUNDR* varied from −40% to +52% and −6% to +33% for the samples of Australian and UK defined benefit pension funds, and from 6% to 85% for the sample of Australian defined contribution pension funds. *FUNDR* is thus relatively lower for the sample defined benefit pension funds, partially because the denominator of the ratio (pension benefits paid) is lower for defined contribution pension funds, reflecting the fact that they are generally more mature than defined contribution pension funds. On the other hand, their *INVRISK* is relatively higher. This possibly reflects the fact that employer sponsors will seek to influence defined benefit pension fund investment strategy in terms of the risk/return trade off. By contrast, the relatively more conservative investment strategy of the sample of Australian defined contribution pension funds more likely reflects the aggregated, unique preferences of their individual participants.

## 6. Empirical tests

While each of the empirical proxies used to test the proprietary and political cost hypotheses are assumed to be independent, it may be that they are in fact measuring the same underlying variable.[10] Pearson correlation coefficients between the independent variables are presented in Table 3 and again are reported separately for the defined benefit fund (Panel A) and defined contribution fund (Panel B) samples. For the Australian defined benefit pension fund sample, there are statistically significant correlations between *EXPENSE* and *INVRISK*, *INVRTN* and *LIABRISK* and *EXPENSE* and *LNSIZE*, but not at the 1% level. For the Australian defined contribution pension fund sample, *FUNDR* is significantly correlated with *EXPENSE, LNSIZE* and *INVRTN*. These correlations are not unexpected, since *FUNDR* is likely to interact with other variables that affect the financial performance of defined contribution pension funds.[11] The negative correlation between *FUNDR* and *INVRTN* observed for the sample of Australian defined contribution pension funds is not problematic. However, since the other correlated variables are proxies for political costs rather than proprietary costs, they are not expected to reduce the explanatory power of *FUNDR*. No correlation among the variables for the UK sample is statistically significant at the 1% level.

Table 4 presents ordinal logistic regressions, with predicted signs, parameters, asymptotic t-statistics, a chi-square statistic and a paired rank correlation.[12] For all three samples, the results indicate that the overall chi-squared statistics are statistically significant and the paired rank classification is superior to a naïve classification (that all funds would comply). This suggests that the overall models have significant explanatory power for both defined benefit and defined contribution pension funds.

Except for *INVRTN*, most of the empirical proxies for the proprietary cost hypothesis have the predicted signs and have significant explanatory power for disclosures by managers of both the Australian defined benefit pension fund sample, consistent with hypothesis 1a. Similarly, except for *FUNDR* for UK defined benefit funds, no empiri-

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[10] Both parametric (t-test) and non-parametric Chi-square tests of the univariate relationship between discretionary disclosure and each of the independent variables yields equivalent results to those reported by the multivariate tests reported in Table 4. The advantage of the multivariate tests is that it permits more detailed specification tests and permits more accurate testing of Bodie's (1990) hypothesis concerning the various sources of retirement income risk that pension fund participants would like to insure themselves against.

[11] Sensitivity tests were conducted on the regressions by using alternative specifications of *FUNDR* (e.g. changing the denominator to total pension fund assets and *INVRISK* (e.g., changing the definition of risky assets to include both equities and long-term bonds). The results were consistent with those discussed elsewhere.

[12] The paired rank correlation classification compares all differing pairs of observations and classifies them as concordant if the higher level response has a higher predicted probability than the lower level response. This classification uses the entire distribution of probabilities and is closer to a goodness-of-fit test (Scott, 1994: 36), and thus is reported in Table 4.

**Table 4**
**Multivariate tests of the determinants of voluntary financial reporting to participants by Australian and UK pension funds using logistic regression**

| | *Defined contribution pension funds* | | *Defined benefit pension funds* | | |
|---|---|---|---|---|---|
| | | Australia (N=65) | | Australia (N=54) | UK (N=100) |
| Independent variable | Expected sign | Ordinal | Expected sign | Ordinal | Ordinal |
| *EXPENSE* | (−) | $-0.62^{b}$<br>(2.00) | (−) | $-2.26^{b}$<br>(1.87) | $-0.78^{a}$<br>(2.33) |
| *LNSIZE* | (+) | $0.39^{b}$<br>(1.73) | (?) | 0.3<br>(1.48) | $0.33^{a}$<br>(7.25) |
| *FUNDR* | (?) | −0.67<br>(0.13) | (+) | $0.06^{d}$<br>(1.55) | $0.14^{c}$<br>(4.07) |
| *INVRTN* | (−) | $-0.10^{d}$<br>(−1.67) | (+) | −0.03<br>(0.20) | 0.01<br>(0.01) |
| *INVRISK* | (?) | 0.01<br>(0.03) | (−) | $-0.08^{c}$<br>(2.16) | 0.00<br>(0.12) |
| Chi-square (sig.level) | | 17.00 (0.08) | | 17.12 (0.01) | 17.53 (0.01) |
| Paired rank correlation | | 85.9% (<0.01) | | 83.3% (<0.01) | 81.1% (0.01) |
| Classification (sig level) | | | | | |
| Dependent variable: | | | | | |
| Ordinal = 1 FRS compliance | | 48 | | 28 | 51 |
| = 0 IRG disclosure | | 17 | | 26 | 49 |
| | | N=65 | | N=54 | N=100 |

*Notes:* The intercept times are omitted. Variables are as defined in Table 3. Asymptotic t-statistics in parentheses. One-tailed significance levels are a<0.01, b<0.03, c<0.05, d<0.1

cal proxy for the political cost hypothesis is significantly associated with the disclosure decision. In any case, *FUNDR* is not significant at the 5% level.

For the Australian defined contribution pension funds sample, no empirical proxy for proprietary costs is associated with the disclosure decision, while the significance and direction of equivalent relationships are as predicted by hypothesis 2. Overall, most of the variables representing the proprietary cost and political cost hypotheses have the predicted signs, and their significance is generally consistent with the predictions.

## 7. Summary and conclusion

This study extends the empirical literature which seeks to establish the importance of proprietary costs influencing managerial voluntary disclosure choices. It examines the decision faced by Australian pension fund managers to disclose accrued pension benefit liability data in financial reports sent to their participants. This data, which is required by professional financial reporting standards, but not by industry-developed reporting guidelines, conveys useful information to participants about the pension fund's present ability to meet its future cash flow obligations since its disclosure reveals the pension fund's net surplus or deficit. The disclosure decision has proprietary cost implications for managers of Australian defined benefit pension funds, and has political cost implications for managers of Australian defined contribution funds and UK defined benefit funds.

These alternative explanations for the voluntary disclosure decision facing managers of various types of pension fund are tested on representative samples of 119 Australian and 100 UK pension fund annual reports. Various empirical proxies for both types of costs are utilised to capture various dimensions of pension fund financial performance, which prior research suggests is potentially value-relevant to employee participants. The empirical results are most consistent with the hypothesised relationships in terms of their predicted direction and significance, and in their consistency across samples. However, the results should be treated cautiously, due to sample data collection restrictions. The empirical proxies are based on a limited time interval (particularly *EXPENSE* and *INVRTN*), and some may be sensitive to variations in growth rates both within the sample and over time.

In summary, pension fund managers' disclosure decisions are consistent with proprietary and political cost theories. This conclusion holds for funds operating both with differing ownership structures in the same institutional setting (Australian defined benefit versus defined contribution pension funds) and with equivalent ownership structures in differing institutional settings (Australian versus UK defined benefit pension funds).

## References

Amir, E. and Benartzi, S. (1998). 'The expected rate of return on pension funds and asset allocation as predictors of portfolio performance'. *The Accounting Review*, 73 (3), March: 335–352.

Anderson, D. and Sharpe, L. (1992). 'Compliance and controversy: the AAS 25 paradox'. *Australian Accounting Review*, 1(4), June, 34–41.

Ang, N., Gallery, N. and Sidhu, B. K. (2000). 'The incentives of Australian public companies lobbying against proposed superannuation accounting standards'. *Abacus*, 36 (1): 40–70.

Ang, N., Gallery, G. and Sidhu, B. K. (1999). 'The value relevance of superannuation disclosures by Australian-listed firms sponsoring defined benefit plans'. *Accouunting and Finance*, 39 (2): 205–228.

Ball, R. and Foster, G. (1982). 'Corporate financial reporting: a methodological review of empirical research'. *Journal of Accounting Research* (Supplement), 20: 161–234.

Barth, M. (1991). 'Relative measurement errors among alternative pension asset and liability measures'. *The Accounting Review*, 66 (3): 433–463.

Barth, M., Beaver, W. H. and Landsman, W. R. (1992). 'The market valuation implications of net periodic cost components'. *Journal of Accounting and Economics* 15 (1): 27–62.

Bodie, Z. (1990). 'Pensions as retirement income insurance'. *Journal of Economic Perspectives*, 28 (1): 28–49.

Bodie, Z., Light, J. O., Morck, R. and Taggart, R. (1987). 'Funding and asset allocation in corporate pension plans', in Z. Bodie, J. Shoven and D. Wise (eds.). *Issues in Pension Economics*, University of Chicago Press: Chicago.

Brennan, M. (1995). 'The individual investor'. *Journal of Financial Research*, 17 (1): (Spring): 59–74.

Cramer, J. J. and Neyhart, C. A. (1980). 'A conceptual framework for accounting and reporting by pension plans'. *Abacus*, 16 (1): 3–16.

Daley, L. (1984). 'The valuation of reported pension measures for firms sponsoring defined benefit plans'. *The Accounting Review*, 59 (2): 177–198.

Dhaliwal, D. (1986). 'Measurement of financial leverage in the presence of unfunded pension obligations'. *The Accounting Review*, 61 (4): 651–662.

Fama, E. F. and Jensen, M. C. (1983). 'Agency problems and residual claims'. *Journal of Law and Economics*, 26 (3): 327–250.

Fogarty, T. J. and Grant, J. (1995). 'Impact of the actuarial profession on financial reporting'. *Accounting Horizons*, 9 (3): 23–33.

Herbohn, K. and Buchan, M. (1995). 'An investigation of AAS 25—the responses of superannuation plans and their members', *Accounting Research Journal*, 8 (1): 4–19.

Holthausen, R. W. and Leftwich, R. W. (1983). 'The economic consequences of accounting choice—implications of costly contracting and monitoring'. *Journal of Accounting and Economics*, 5 (2): 77–177.

Insurance and Superannuation Commission (1994). *Superannuation Bulletin 1991–92*. Australian Government Publishing Service: Canberra.

Jeffrey, R H. (1984). 'A new paradigm for measuring portfolio risk'. *Journal of Portfolio Management*, 11 (1): 33–40.

Klumpes, P. J. M. (1993). 'Maxwell and the financial accountability of Australian superannuation plans: a critical review of proposed law reforms'. *Australian Business Law Review*, 21 (3): 194–206.

Klumpes, P. J. M. (1994a). 'Voluntary compliance and controversy: the AAS 25 reporting paradox revisited'. *Australian Accounting Review*, 4 (1): 25–36.

Klumpes, P. J. M. (1994b). 'The politics of agenda-setting: a case study of Australian pension accounting rulemaking'. *Abacus*, 30 (2): (September): 141–159.

Klumpes, P. J. M. and McCrae, M. (1999). 'Evaluating the financial performance of pension funds: an individual investor's perspective'. *Journal of Business Finance and Accounting*, 26 (3): 261–281.

Klumpes, P. J. M. and Manson, S. (2000). 'Compliance with the Revised SORP Financial Reports of Pension Schemes: empirical evidence'. *ACCA-PRAG Research Report*. Forthcoming.

Lambert, C. and Gallery, N. (1996). 'Policy making in employers' accounting for defined benefit pension obligations: an Australian-US comparison'. Working paper.

Landsman, W. (1986). 'An empirical investigation of pension fund property rights'. *The Accounting Review*, 61 (4): 662–691.

Lim, S. and McKinnon, J. (1993). 'Voluntary disclosure by NSW statutory authorities: the influence of political visibility'. *Journal of Accounting and Public Policy*, 12 (3): 189–216.

Logue, D. E. and Rader, J. S. (1998). *Managing Pension Plans*. Harvard Business School Press: Boston.

Mitchell, O. S. and Smith, R. S. (1994). 'Pension funding in the public sector'. *Review of Economics and Statistics*, 76: 278–302.

Scott, T. W. (1994). 'Incentives and disincentives for financial disclosure: voluntary disclosure of defined benefit pension plan information by Canadian firms'. *The Accounting Review*, 69 (1): 26–43.

Stone, M. S. (1987). 'A financing explanation for overfunded pension plan terminations'. *Journal of Accounting Research*, 25 (2): 317–326.

Stone, M. S. (1991). 'Firm financial distress and pension plan continuation-replacement decisions'. *Journal of Accounting and Public Policy*, 10 (3): 175–206.

Thomas, J. K. (1989). 'Why do firms terminate their overfunded pension plans?' *Journal of Accounting and Economics*, 11 (3): 361–398.

Tinker, T. and Ghicas, D. (1993). 'Dishonored contracts: accounting and the expropriation of employee wealth'. *Accounting, Organizations and Society*, 8 (4): 361–380.

Verrecchia, R. E. (1983). 'Discretionary Disclosure'. *Journal of Accounting and Economics*, 5 (3): 179–194.

Walker, R. G. (1991). 'Will accounting for super funds scare the horses?' *Superfunds*, November, 31–33.

Watts, R. L. and Zimmerman, J. L. (1990). 'Positive accounting theory: a ten year perspective'. *The Accounting Review*, 65 (1): 131–156.

World Bank (1994). *Averting the Old Age Crisis*. Oxford University Press: New York.

Zmijewski, M. E. and Hagerman, R. L. (1981). 'An income strategy approach to positive theory of accounting standard setting/choice'. *Journal of Accounting and Economics*, 3 (2): 129–149.

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# FRS3 earnings, Headline earnings, and accounting-based valuation models

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**Abstract**—This paper examines the joint and incremental explanatory value of book value per share and two measures of earnings per share (Headline and FRS3 EPS) for the cross-section of UK share prices. We find that Headline EPS explains a significant proportion of cross-sectional variation in share price. Book value per share contributes incremental explanatory value to the model, which is both statistically and economically significant. However, the incremental explanatory value contributed by FRS3 EPS is negligible. We conclude that FRS3 should be revised to encourage firms to report something like Headline EPS on a standardised basis in addition to FRS3 EPS.

## 1. Introduction

This paper reports an empirical analysis of the explanatory value of accounting measures of earnings and book value for the cross-section of UK share prices following the implementation of FRS3. We consider the joint and incremental explanatory value for share price of book value per share and two measures of earnings per share, one which was mandated by FRS3, and the other which was introduced by the investment analysis community as a considered response to FRS3. There are two main reasons why we believe this exercise is worthwhile. First, FRS3 has been heralded as a major change in accounting practice in the UK with substantial implications for the way important financial indicators, such as earnings per share, are reported. It is of some interest to know whether the relation between accounting-based estimates of firm valuation are particularly sensitive to the changes in earnings reporting mandated by FRS3. Second, in addition to limiting the options available to firms when reporting bottom-line earnings, FRS3 has attempted to move the focus of investors' attention away from a single earnings-based measure of performance, and to encourage investors to consider a range of performance measures including the balance sheet position of the firm. This change of emphasis away from earnings towards a broader information set, including book value per share, is consistent with the theoretical stance of Ohlson (1995). More generally, accounting theorists have never agreed on the extent to which financial reporting should be driven by a balance sheet or an earnings perspective. This paper attempts to make a modest contribution to these debates by assessing the extent to which the statistical performance of the conventional price earnings valuation model is improved a) by incorporating multiple measures of earnings, and b) by bringing in book value per share as a second indicator of financial strength.

## 2. Financial Reporting Standard No. 3

FRS3 *Reporting Financial Performance* was introduced by the UK Accounting Standards Board (ABS) on 29 October 1992. Application of the standard was mandatory for accounting periods ending on or after 22 June 1993. Firms with accounting year ends falling between 29 October 1992 and 21 June 1993 could elect to implement the new standard immediately but were not required to do so. FRS3 superseded SSAP 6 (Revised) *Extraordinary Items and Prior Year Adjustments* and amended SSAP3 *Earnings Per Share*, as well as making consequential changes to other standards.

FRS3 formed the first major step towards a fundamental reorientation of financial reporting practice in the UK. Prior to FRS3 UK accounting practice had been underpinned by a 'primacy of bottom line earnings' philosophy (Davies et al.

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1997) with the balance sheet seen as simply a link between successive profit and loss accounts. The introduction of FRS3 signalled the adoption of a balance sheet orientation (*Accountancy,* October 1993, p.11; Davies et al. 1997) to financial reporting by the ASB and a concomitant decision to de-emphasise any particular measure of earnings per share. The major new requirements of the standard were:

(1) The adoption of a much narrower definition of extraordinary items than the definition which appeared in SSAP 6. Effectively, extraordinary items were eliminated.
(2) The introduction of a requirement to report earnings per share AFTER extraordinary items, and to report this particular measure of EPS at least as prominently as any other measure that the firm chooses to report.
(3) The introduction of a new primary statement of total recognised gains and losses which includes the profit and loss for the period together with all other movements on reserves reflecting recognised gains and losses attributable to shareholders.
(4) The introduction of a new statement of reconciliation of movements in shareholders' funds which describes the changes in the firm's financial position.
(5) The introduction of a requirement to highlight a number of components of financial performance. This includes separate disclosure of the contribution to operating profit of discontinued operations and new acquisitions, as well as specific disclosure of exceptional items relating to disposals, reorganisation, and sales of fixed assets.

The present paper focuses specifically on the value-relevance of the new earnings per share measure mandated by FRS3. It makes no attempt to assess the incremental information content of the statement of total recognised gains and losses, the reconciliation of movements in shareholders' funds, and the additional disclosures of earnings components FRS3 introduced.[1]

## 3. Headline earnings

Following the introduction of FRS3, the Institute of Investment Management and Research (IIMR) issued *Statement of Investment Practice No. 1 'The Definition of Headline Earnings'* (1993) (SIP1). This statement broadly welcomed FRS3. In particular it accepted that 'to attempt to define a single earnings figure for all purposes is bound to fail'. In general earnings numbers are needed for a variety of purposes, and 'different purposes may lead to different numbers'.

The statement went on to argue that 'two purposes stand out as of practical importance':

a) A measure of the company's maintainable earnings capacity.

b) A factual 'headline' figure for historic earnings that can serve as a benchmark figure for the trading outcome for the year.

The statement argued that it is not possible to formulate an objective basis for calculating maintainable earnings. To quote:

> 'The calculation of maintainable earnings figures cannot be put on a standardised basis.'

However, the statement argued, there is a need for an earnings figure, which can be used as an unambiguous reference point between users, the press, and statistical companies. In particular, such a figure might be used 'in addition to the bottom line figure required by FRS3, *especially in preliminary and interim announcements.*' (emphasis added). The statement went on to argue that it would be preferable if FRS3 earnings per share were not referred to as 'earnings' because the concept of 'earnings' is normally understood to refer to the ongoing capacity of the company to generate wealth from operations. Finally, the statement was concerned to identify an earnings per share number which could reasonably be used as the standardised basis for calculating price earnings ratios. FRS3 earnings were seen as being unsuitable for this purpose because of their all-inclusive nature.

The statement set out a detailed definition of Headline earnings, the main features of which were:

- All trading profits are included.
- The trading profits of discontinued operations and new acquisitions are included, but profits or losses on disposals are excluded.
- Revaluations and asset write-offs are excluded.

These adjustments can often make a material difference to the reported earnings per share, especially when a firm has significant non-recurring items such as asset disposals and write-offs. The result section contains descriptive statistics that document the materiality of these differences for our sample.

Subsequent to the release of SIP1 a number of companies chose to report Headline earnings per share as well as FRS3 EPS (for examples, see the annual reports of 600 Group 1996, and Coats Viyella 1995). According to a Coopers & Lybrand survey in 1994 (Holgate and Roberts, 1994), 54 of the UK top 100 companies disclosed one additional EPS figure, and 16 of these reported the IIMR headline figure. Other companies reported a number similar in definition to, but not identical to, the Headline earnings number (for example, see the Annual report of ICI 1994).

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[1] A requirement to provide separate information on the contribution to operating profit of discontinued operations represented, for most companies, a new form of disclosure. An assessment of the incremental information content of such disclosures will require a completely different research design (such as an event study) from the one employed below.

The purpose of this paper is to assess the relative usefulness of FRS3 and Headline earnings per share, as summary valuation statistics. A rationale for this approach now follows.

## 4. Rationale for and limitations of the valuation perspective

The purpose of this paper is to make a preliminary assessment of the ASB's decison (a) to move away from a primacy of earnings approach to a balance sheet orientation, and (b) to encourage firms to emphasise earnings per share after all exceptional and extraordinary items. In addition, we wish to assess the extent to which Headline earnings contribute useful information over and above book value and FRS3 earnings per share. In making this assessment we have focused on the usefulness of accounting information for the purpose of share valuation. This section motivates this approach and sets out the main hypotheses to be tested in the empirical analysis reported below.

Two principal assumptions underlie our approach to assessing the contribution of FRS3:

(1) That an important function of financial reporting is to provide information that is relevant to equity valuation;

(2) That at least one group of users of financial reports requires highly summarised information as a basis for approximate valuation.

In particular, we assume that one of the purposes of FRS3 and Headline earnings is to help in narrowing the information and expertise gap between ordinary shareholders and professional investors. This was one of the purposes explicitly referred to in *Statement of Investment Practice No. 1*.

> 'This is desirable also for a second reason, which is that there are a large number of users of accounts who do not have the time or the expertise to make the necessary detailed investigations that are distilled into the final market price. They should be provided with an understandable figure.'

Our assessment of the usefulness of summary financial reports is based on how well the cross-section of share prices can be explained on the basis of two fundamental measures of a company's financial strength, i.e. book value per share and earnings per share. In assessing the usefulness of FRS3 and Headline EPS we consider two main questions:

(1) What is the evidence that book value per share improves the performance of simple price/earnings valuation models?

(2) As compared to Headline earnings per share, what evidence is there that the FRS3 EPS contributes additional explanatory value?

The empirical analysis reported below could potentially produce any of the following eight outcomes:[2]

| | *Book value material* | *Book value not material* |
|---|---|---|
| Both FRS3 and Headline material | A | E |
| FRS3 material, Headline not material | B | F |
| Headline material, FRS3 not material | C | G |
| Neither FRS3, or Headline material | D | H |

Outcomes A to D would be supportive of the ASB's decision to encourage a balance sheet orientation in financial reporting. Outcomes E to G would tend to support the traditional view of the balance sheet as simply a link between successive income statements.[3] Outcome H would seriously call into question the general usefulness of accounting statements for valuation purposes. Outcomes B and F would provide strong support for highlighting FRS3 earnings in financial statements. Outcomes A and E would support the ASB's attempt to encourage investors to consider more than one measure of earnings in their evaluation of companies. Outcomes C and G would provide support for highlighting Headline earnings per share and call into question the wisdom of only highlighting FRS3 earnings per share.[4]

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[2] Note though that, to the extent that the disciplines of FRS3 imbue the financial reporting process with increased integrity, one might be willing to accept some reduction in the explanatory value of FRS3 EPS as a price worth paying for that increased integrity.

[3] Strictly speaking, it would imply that the particular conventions companies employ for reporting balance sheet values are not helpful for valuation purposes.

[4] Of course we cannot rule out the possibility that FRS3 may have been useful for other reasons. For example, the increased disclosures required by FRS3 and the more restrictive definition of extraordinary items may have served to increase the all round integrity of the financial reporting process. Other research methods, such as surveys and case studies, will be needed to assess this possibility.

## 5. Research design issues

We estimate the following accounting-based valuation model:

$$P_i = \beta_0 + \beta_1 EARN_i + \beta_2 EPS_i + \beta_3 BOOK_i + u_i \qquad (1)$$

where $P_i$: Cum-div adjusted share price of firm i four months subsequent to the end of financial year 1993 or 1996;
$EARN_i$: Headline earnings per share of firm i for 1993 or 1996;
$EPS_i$: FRS3 earnings per share of firm i for 1993 or 1996;
$BOOK_i$: Book value per share of firm i at the *start* of 1993 or 1996;
$u_i$: a mean zero disturbance term.

Ohlson (1995) shows that the value of the firm will be an exact linear function of book value per share, earnings per share, and a third (unobservable) term representing other value relevant information, given the following conditions: (i) clean surplus accounting, (ii) share price equals the discounted present value of dividends at a constant discount rate, (ii) residual income[5] follows an AR(1) process.[6] An important special case of (1) emerges if residual income follows a random walk. In this case the book value parameter is zero. In Ohlson's formal derivation of the clean surplus valuation model under unbiased accounting, the incercept is predicted to be zero. In our empirical analysis we include an intercept in the regression equation and interpret a significant intercept as evidence of model mis-specification.

The model assumes that earnings are clean surplus earnings. Stark (1997) has shown that this assumption is not necessary for the Ohlson model to hold. In particular, the above model will hold, to a good approximation, provided any dirty surplus components of earnings are purely transitory, i.e. one-off items. In an empirical paper, O'Hanlon and Pope (1996) have shown that, for UK quoted companies, the dirty surplus components of earnings have virtually no information content for valuation purposes even over very long (20-year) windows.

This general valuation approach has been applied in recent papers by Strong et al. (1995), Green et al. (1996), Rees (1997) in the UK, and Collins et al. (1997) in the US. Our approach is closest to Strong et al. We differ from them primarily in the use of two measures of earnings instead of only one. Rees (1997), using data from 1987 to 1995, partitions earnings into dividends and retained earnings. He finds that his approach leads to higher explanatory values with dividends attracting a higher response coefficient than retained earnings. Strong (1997) notes that a theoretical basis for the Rees approach is yet to be supplied. We differ from Rees by introducing Headline earnings as well as reported earnings into the model. Consistent with the study by Collins et al. (1997), we do not incorporate dividends into our model, because this would require a significant generalisation of the theoretical framework to explicitly model the theoretical role of dividends. There are a number of reasons why dividends might be value relevant beyond reported earnings, and these are the subject of ongoing research. In particular Hand and Landsman (1999) find that dividends are particularly value relevant for firms reporting losses. In the results section we present sensitivity results for sub-samples that exclude loss-making firms.

We report the results of a regression of share price on book value per share (denoted BOOK), FRS3 earnings per share (denoted EPS), and Headline earnings per share (denoted EARN).[7] The t-value associated with each variable indicates the significance of their incremental explanatory value for the regression.

A general problem that arises with models of this kind is the need to consider whether to deflate the model, and if so by which variable, and how to handle any remaining problems caused by outliers. We have chosen to work with per share data, thus our deflator is the number of shares. We have also adopted a rigorous approach to the treatment of outliers, which is explained below. Appropriate

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[5] Residual income per share is defined as $EPS_{it} - rBOOK_{it-1}$ when r is the discount rate.

[6] The Ohlson (1995) valuation model, in per share terms, has ex-div price on the left hand side of the equation, and earnings per share, end of period net dividends per share, and end of year book value per share on the right hand side, i.e.

$$P_t = k(\varphi EPS_t - d_t) + (1-k)BOOK_t + \alpha_2 \nu_t$$

Our equation (1), which has cum-div price as the dependent variable and start of period book value per share as an independent variable, follows directly from the Ohlson model by using the clean surplus equation and moving dividends to the left hand side of the equation.

[7] In this study share price, book value and FRS3 EPS are all obtained from *Datastream*. To be consistent, Headline EPS (EARN) is calculated based on the following items from *Datastream*:

EARN = [earned for ordinary (i.e. *Datastream* item 210) -reorganisation or restructuring costs (i.e. *Datastream* item 1080) + tax on reorganisation or restructuring costs + minority interest in reorganisation or restructuring costs]/number of outstanding shares.

Tax on reorganisation or restructuring costs = Reorganisation or restructuring costs*[Tax on special items (i.e. *Datastream* item 1094)/total special items (i.e. *Datastream* item 1083].

Minority interest in reorganisation or restructuring costs = Reorganisation or restructuring costs* [Minority interest in special items (i.e. *Datastream* item 1097)/total special items].

The median difference between Headline EPS proxy and Headline EPS in EXTEL, based on 78 companies (i.e. 11% of total sample size) with higher earned for ordinary, is 1%. In addition, the Pearson correlation coefficient between Headline EPS proxy and Headline EPS in EXTEL is 98%.

corrections to our test statistics have also been made to allow for any residual heteroscedasticity.

Preliminary estimates of the model revealed that the findings could be sensitive to the treatment of influential observations (outliers). The criteria we used to identify influential observations were based on the DFFITS of the regression as defined by Belsley et al. (1980), who suggest that the influence of observations with large studentised residuals or DFFITS should be minimised rather than deleted (i.e. bounded-influence estimation). They minimise the influence of individual outliers by using a simple one-step bounded-influence estimator which is based on Weighted Least Squares.[8]

In this study we adopt an iterative approach using a DFFITS cutoff point corresponding to a 99% confidence interval for a standard normal distribution. In implementing this approach we found that 20 observations were particularly influential. When we repeated the estimations with these observations deleted, the primary results were not materially different from those produced by our iterative approach. This study therefore only reports the regression results after these 20 observations were weighted using the Belsley et al. approach.

## 6. Data sources and descriptive statistics

### 6.1. Sample selection

The data for the study was collected from *Datastream*. The study was based on the population of 1,521 companies that were fully quoted on the London Stock Exchange on 28 January 1994. After deleting companies which (a) fell under banking, financial or utility industries (313 companies), (b) adopted FRS3 in 1994 (201 companies), (c) had insufficient accounting or share price data for the period from 1990 to 1994 (291 companies), (d) changed their accounting period and therefore provided financial statements twice in one year (16 companies), and (e) issued secondary common shares (11 companies), only 689 valid sample companies remained for this study. Among them, 233 companies which adopted FRS3 before its adoption deadline were early adopters. The remaining 456 companies were late adopters.

In order to assess the sensitivity of our results to choice of time period we also collected 1996 data for the 612[9] companies that survived through to financial year 1996. Of these, 201 were early adopters and 411 were late adopters. As a further check on the robustness of our main findings, we also present regression estimates based on the changes in price and changes in the independent variables between 1993 and 1996.

### 6.2. Descriptive analysis

Table 1, panels A and B, report descriptive statistics for the dependent and independent variables for 1993 and 1996 respectively before deleting outliers (the unit for mean, standard deviation, and median is pence). Panel C of Table 1 reports descriptive statistics relating to the changes in the study variables over the three years, also before deleting outliers.

Looking at median values, because these are not sensitive to outliers, we see that median price was roughly double the median book value both in 1993 and 1996. The median of EARN divided by the median of BOOK was around 8.7% in 1993 and around 11.6% in 1996. The median of EARN divided by the median price was around 4.5% in 1993 and 6.4% in 1996.

Panels A to C also suggest that the data contain outliers. For example the mean value of EPS is considerably lower than the median value, and the measures for skewness and kurtosis for all four variables provide strong indications of non-normality.

Table 1 Panel D reports the coefficients of correlation between the three independent variables after outliers are deleted. The statistics show that the two earnings variables are more closely related to each other than either of them are to book value. The correlations between the two earnings variables, though high, are unlikely to be high enough to cause a multicollinearity problem, at least for our main 1993 sample. For example, the full sample correlation of 0.75 implies that only 56% of the cross-sectional variation in one of the earnings variables is explained by the variation in the other earnings variable. The corresponding statistic for the 1996 cross-section is more worrying, but the statistic for the changes between 1993 and 1996 is comfortably low. Certainly, it is clear that these two variables are far from perfectly collinear.

## 7. Results

### 7.1. Principal findings

Table 2 reports the main regression results for the 1993 and 1996 cross-sections, and for the

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[8] In their study, the weight is $0.34/|\text{DFFITS}_i|$ for observations with $|\text{DFFITS}_i|$ higher than 0.34 and 1 otherwise. The cutoff DFFITS of 0.34 is chosen for approximately 95% asymptotic efficiency in their study, based on its number of parameter estimates and total observations. However, Maddala (1992: 489) directly uses this cutoff for DFFITS to control the influence of individual outliers in his study.

[9] The data for the 1996 cross-section was collected in August 1997, so all observations were adjusted for stock splits from January 1996 through to August 1997 to be comparable to data for the 1993 cross-section, which was collected in January 1996.

**Table 1**
**Descriptive statistics**

*Panel A: 1993: All companies before deleting outliers (689 observations)*

| *Variables* | *Mean* | *std dev* | *Median* | *Quartile index* | *Skewness* | *Kurtosis* |
|---|---|---|---|---|---|---|
| PRICE | 226.56 | 294.69 | 147.00 | 16.03 | 5.56 | 51.10 |
| BOOK | 120.45 | 309.51 | 76.04 | 85.44 | 11.79 | 230.94 |
| EARN | 6.65 | 35.62 | 6.61 | 68.85 | −8.44 | 165.42 |
| EPS | 0.63 | 115.22 | 6.86 | 200.55 | −11.85 | 420.59 |

*Panel B: 1996: All companies before deleting outliers (612 companies)*

| *Variables* | *Mean* | *std dev* | *Median* | *Quartile index* | *Skewness* | *Kurtosis* |
|---|---|---|---|---|---|---|
| PRICE | 299.48 | 828.13 | 155.63 | 65.15 | 19.24 | 431.06 |
| BOOK | 124.60 | 197.50 | 85.13 | 33.90 | 8.89 | 122.84 |
| EARN | 14.80 | 28.02 | 9.91 | 32.64 | 7.83 | 136.26 |
| EPS | 13.36 | 30.24 | 9.05 | 32.07 | 6.59 | 104.94 |

*Panel C: Changes between 1993 and 1996 All companies before deleting outliers (612 companies)*

| *Variables* | *Mean* | *std dev* | *Median* | *Quartile index* | *Skewness* | *Kurtosis* |
|---|---|---|---|---|---|---|
| PRICE | 67.54 | 645.94 | 8.20 | 142.26 | 21.39 | 500.49 |
| BOOK | −1.10 | 264.87 | 7.51 | 210.55 | −18.32 | 405.69 |
| EARN | 7.38 | 34.10 | 3.76 | 76.94 | 11.51 | 193.93 |
| EPS | 12.54 | 120.74 | 3.60 | 239.36 | 18.61 | 398.75 |

*Panel D: Coefficients of Correlation between Independent Variables 1993 Sample (669 observations after deleting outliers)*

| *Variables* | *BOOK* | *EPS* |
|---|---|---|
| BOOK | 1.00 | 0.24 |
| EPS | 0.24 | 1.00 |
| EARN | 0.37 | 0.75 |

*1996 Sample (603 companies after deleting outliers)*

| *Variables* | *BOOK* | *EPS* |
|---|---|---|
| BOOK | 1.00 | 0.46 |
| EPS | 0.46 | 1.00 |
| EARN | 0.60 | 0.85 |

*Changes between 1993 and 1996 Sample(602 companies after deleting outliers)*

| *Variables* | *ΔBOOK* | *ΔEPS* |
|---|---|---|
| ΔBOOK | 1.00 | −0.20 |
| ΔEPS | −0.20 | 1.00 |
| ΔEARN | −0.09 | 0.60 |

'changes' regression for the period 1993 to 1996. The results indicate that only BOOK and EARN are statistically significant at conventional levels[10] in both the 1993 and the changes regression. In the 1996 regression EPS is also statistically significant. The results conclusively reject research outcomes B, D, E, F, G, and H. Both BOOK and EARN are value relevant. The results for FRS3 earnings are less clear cut, EPS is significant in only one of the three regressions. On balance, the evidence is most consistent with research outcome C, i.e., EPS has no valuation relevance beyond EARN and BOOK.

A slightly worrying feature of our results is the finding of a statistically significant incercept in the 1993 and 1996 regressions as shown in Table 2. This finding is consistent with the findings of other empirical studies based on the clean surplus framework such as Hand and Landsman (1999), but the

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[10] All test statistics have been calculated using White's correction to the variance/covariance matrix for potential heteroskedasticity.

**Table 2**
**Main Regression results: regressions of share price on book value per share, Headline EPS and FRS3 EPS**

| *Year* | *Sample size* | *Intercept* | *BOOK* | *EARN* | *EPS* | *Adjusted $R^2$* |
|---|---|---|---|---|---|---|
| 1993 | 689 | 54.37<br>(12.76)*** | 0.59<br>(12.30)*** | 10.02<br>(18.94)*** | 0.03<br>(0.11) | 75.56% |
| 1996 | 612 | 37.70<br>(6.38)*** | 0.25<br>(3.69)*** | 11.30<br>(14.08)*** | 1.17<br>(2.28)** | 71.41% |
| **Changes**<br>1996-1993 | 602 | 4.55<br>(0.97) | 0.44<br>(4.98)*** | 5.55<br>(9.66)*** | 0.33<br>(1.33) | 25.24% |

*Note:* For 1993 and 1996 the results were produced by regressing share price on the three independent variables. For the changes from 1993 to 1996, the reults were produced by regressing the change in share price on the changes in the independent variables over that period. The results reported are those for the full sample where outliers have been detected and weighted using the DFFITS procedure outlined in the text.

***significant at the 1% level (two-tailed test)
**significant at the 5% level (two-tailed test)

existence of a significant intercept is not predicted by the Ohlson theory. Further research is needed to investigate the reasons for the detection of a statistically significant intercept. However, we have no reason to believe that the adoption of a more general model could reverse our main finding, i.e., that EARN reflects considerably more value relevant information than EPS. This view is supported by the results for the changes regression which show a much reduced t value for the intercept term. Indeed, this term is not significant in the changes regression.

### *7.2. Sensitivity of results to exclusion of negative earnings*

Hayn (1995) and Hand and Landsman (1999) have shown that the results of market-based studies are particularly sensitive to the treatment of negative earnings observations due to the transitory nature of reported losses.

Table 3 reports sensitivity results for our main model. The model was re-estimated for 1993 and 1996 with either negative FRS3 or negative Headline earnings observations excluded. In all cases the adjusted R square value increased by between 5–8%. The size and significance of the intercept and BOOK terms were reduced, especially in the 1996 sample.

The exclusion of negative Headline earnings produces consistently higher EARN parameters and higher (lower) EPS parameters in 1993 (1996). Especially interesting, in the present context, are the results of excluding negative EPS observations. In this case the values of the EARN parameters are not materially altered, although their t values are reduced, but the EPS parameters increase both in magnitude and statistical significance. These results suggest that a likely cause of the low incremental explanatory value of FRS3 earnings for share price is the transitory nature of losses reported under FRS3.

## 8. Conclusion

Our discussion of the rationale for a valuation perspective identified eight possible outcomes to this research. Our interpretation of the evidence reported above is that it is best represented by outcome C.

It is apparent that book value per share contributes incremental explanatory value which is both statistically and economically significant. Perhaps even greater improvements could be obtained if all firms routinely provided book values on a variety of valuation bases (e.g. realisable values). We have found that FRS3 earnings contributed no material explanatory power for share price over and above Headline earnings and book value per share in our full sample, although it did contribute incremental explanatory value once the sample has been screened for firms reporting FRS3 losses. We have also found that Headline earnings do a much better job at explaining share values than FRS3 earnings. Our evidence suggests that firms should be encouraged to provide a measure of sustainable earnings (such as Headline) to complement FRS3 earnings.

Overall, our results suggest that the introduction of FRS3, and the associated initiative of the IIMR, was a move in the right direction so far as

**Table 3**
**Sensitivity of results to exclusion of negative earnings: regression of share price on book value per share, Headline EPS, and FRS3 EPS after deleting firms with negative EPS**

| *Year* | *Sample after deleting firms with* | *Sample size* | *Intercept* | *BOOK* | *EARN* | *EPS* | *Adjusted $R^2$* |
|---|---|---|---|---|---|---|---|
| 1993 | EPS<0 | 538 | 32.22 | 0.17 | 10.07 | 4.80 | 83.13% |
| | | | (7.88)*** | (3.40)*** | (12.91)*** | (7.16)*** | |
| 1993 | EARN<0 | 549 | 32.89 | 0.19 | 13.04 | 1.74 | 82.67% |
| | | | (7.83)*** | (3.80)*** | (20.06)*** | (4.24)*** | |
| 1996 | EPS<0 | 514 | 10.16 | −0.04 | 10.23 | 5.58 | 76.40% |
| | | | (1.66)* | (−0.57) | (9.74)*** | (5.69)*** | |
| 1996 | EARN<0 | 541 | 10.37 | −0.02 | 14.67 | 0.96 | 76.17% |
| | | | (1.78)* | (−0.29) | (19.05)*** | (1.92)* | |

***significant at the 1% level (two-tailed test)
* significant at the 10% level (two-tailed test)

the provision of summary value relevant information is concerned. However, we believe the ASB should re-examine whether companies should be required to report a measure of sustainable earnings, possibly on a standardised basis. Of course one could counter this suggestion by arguing that, since measures of Headline earnings are already available in the market place, then one need not worry too much about requiring companies to supply such information directly to their shareholders. We would question this argument because we believe that company reports should provide concise value-relevant information to small investors. The present situation, under which only some firms directly report variants of 'sustainable' earnings, plays into the hands of professional investors and their advisors. Indeed, it is ironic that a standard primarily devised to remove confusion over the definition of extraordinary items may have induced confusion over the meaning of reported earnings in the minds of small investors.

Finally, we would suggest that further research is needed to address the potential for improving the value relevance of financial reporting in the context of loss-making or low-profitability firms.

## References

Accounting Standards Board (1992). *Financial Reporting Standard No.3: Reporting Financial Performance*. London: ASB.

Belsley, D., Kuh, E. and Welsch, R. (1980). 'Regression Diagnostics: Identifying Influential Data and Sources of Collinearity'. Chapter 2 of '*Detecting Influential Observations and Outliers*'. New York: John Wiley & Sons Inc.

Collins, D., Maydew, E. and Weiss, I. (1997). 'Changes in the value-relevance of earnings and book values over the past forty years'. *Journal of Accounting and Economics*, 24: 39–67.

Davies, M., Paterson, R., and Wilson, A. (1997). '*UK GAAP*' (5th Ed). Ernst & Young. London: Macmillan Reference Ltd.

Green, J., Stark, A. and Thomas, H. (1996). 'UK evidence on the market valuation of research and development expenditures'. *Journal of Business Finance and Accounting*, 23: 191–216.

Hand, J. and Landsman, W. R. (1999). 'The pricing of dividends in equity valuation'. Working paper. University of North Carolina: Chapel Hill.

Hayn, C. (1995). 'The information content of losses'. *Journal of Accounting and Economics*, 20: 125–153.

Holgate, P. and Roberts, H. (1994). 'FRS3: the story continues'. *Accountancy*, (December): 142–143.

Institute of Investment Management and Research (1993). *Statement of Investment Practice No. 1: 'The Definition of Headline Earnings*'. London: IIMR.

Maddala, G. (1992). '*Introduction to Econometrics*'. 2nd Ed. New York: Macmillan Publishing Company.

O'Hanlon, J. and Pope, P. (1996). 'Does Dirty Surplus Earnings Conceal the Facts?' Lancaster University. Working paper (October).

Ohlson, J. (1995). 'Earnings, book value, and dividends in equity valuation'. *Contemporary Accounting Research*, 11: 661–688.

Rees, W. (1997). 'The impact of dividends, debt and investment on valuation models'. *Journal of Business Finance and Accounting*, 24: 1,111—1,140.

Stark, A. (1997). 'Linear information dynamics, dividend irrelevance, corporate valuation and the clean surplus relationship'. *Accounting and Business Research*, 27: 219–228.

Strong, N. (1997). 'Discussion of the impact of dividends, debt and investment on valuation models'. *Journal of Business Finance and Accounting*, 24: 1,141–1,145.

Strong, N., Walker, M. and Harding Z. (1995). 'Price models and earnings response coefficients'. Manchester Univerity. Working paper.

# Is true and fair of over-riding importance?: a comment on Alexander's benchmark

Christopher Nobes*

'He dared well to despise vain things', Alexander as described by Livy (*History*, book ix, section 17).

## 1. Introduction

In the context of establishing criteria against which to judge the adequacy of published financial statements, Alexander (1999) distinguishes between a general over-riding requirement (Type A), an integrated framework (Type B) and detailed regulation (Type C). Alexander adds clarity to the analysis of the hierarchy of principles and policies. Much of his analysis seems correct and useful, but the major conclusion concerning the desirability of an over-ride in standards does not.

Part of Alexander's argument is that:

> unequivocal agreement is necessary that either the Type A criterion is superior to the Type C criterion, or the reverse. (p. 252)

This seems right both for those who make the rules (regulators) and for those who use them (preparers and auditors), although Alexander does not distinguish between these parties. He continues:

> supremacy of Type C specification...is inadequate in a dynamic economy, as choice or change in such regulation is inevitably without reference to a more broadly based objective. (p.252)

Alexander therefore approves (p.251) of IAS 1, which gives supremacy to 'fair presentation' in the preparation of financial statements. It will be argued here that, when considering an over-ride, the analysis would be improved by distinguishing between law and standards, between choice by preparers and choice/change by regulators, and between national and international regulation. It will further be argued that choice by preparers to disobey a regulation is probably a bad thing, even in a dynamic economy, so that Type C regulation should prevail for them; and that choice or change of Type C regulation (by standard setters or other regulators) can nevertheless make reference to a broadly-based objective. That is, Type C should prevail for preparers (and auditors) but Type A for regulators. Consequently, it will be suggested that Alexander is wrong about the need for supremacy of Type A in the *application* of standards, and so is IAS 1.

The argument below begins by examining the purpose and effect of the TFV over-ride in law, and then the differences for national and international standards. Then some examples are given of the dangers of allowing an overriding Type A criterion in international standards. The concluding section suggests that IAS 1 is unusual in the context of Anglo-Saxon standards.

## 2. True and fair in the UK context

### 2.1. *The purpose of the TFV over-ride in law*

The TFV (including the over-ride) in UK law provides a Type A criterion which might be used for several purposes:

i. to help preparers and auditors to choose between the available Type C rules in law or standards;

ii. to help preparers and auditors to interpret Type C rules in law or standards;

iii. to help preparers and auditors where there are no Type C rules;

iv. to force preparers and auditors to assess the need for extra disclosures beyond those in Type C rules;

v. to guide standard setters when developing Type C rules that do not involve breaking Type C rules in law but that are more restrictive than the law (e.g. eliminating LIFO);[1]

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[1] SSAP 9 suggests that LIFO will normally not give a true and fair view, which therefore normally over-rides the permission to use LIFO in the Companies Act 1985, Schedule 4, para 27 (2).

vi. to force or to enable preparers and auditors to depart from Type C rules in standards in undefined circumstances;

vii. to guide standard setters when developing Type C rules in cases where they conflict with Type C rules in law; and then to force or to enable preparers and auditors to follow the standard (e.g. lack of depreciation of investment properties);[2]

and

viii. to force or to enable preparers and auditors to depart from Type C rules in law in undefined circumstances, even beyond point (vii).

Points (vi) to (viii) are expressed as 'to force or to enable' because there is judgement involved and because preparers may *wish* to make the departures.

The TFV over-ride in law is not necessary for points (i) to (v) and is not strictly necessary[3] for point (vi). However, the legal over-ride is the essence of points (vii) and (viii), which is probably why the British were so keen on it as part of the Fourth Directive (Hopwood, 1990; Nobes, 1993). It would enable British standards and other practices to over-ride 'foreign' rules in Directives made by lawyers, civil servants and politicians; and it would enable continual British developments despite the fact that the Directives were unlikely to change for decades.

### *2.2. The legal TFV over-ride of standards*

Alexander (p.243) takes us carefully through the relationship between law and standards. In principle, of course, the law over-rides standards. However, as Alexander points out, the ASB obtained and published counsel's opinion to the effect that there is 'a likelihood that the court will hold that compliance with the standard is necessary to meet the true and fair requirement'. In other words, although the ASB actively uses the legal Type A over-ride so that its own Type C rules can outrank legal Type C rules (points (v) and (vii) above), it has been keen to establish that there should in practice be no Type A over-ride of its own Type C rules by preparers (unlike point (vi) above).

When considering whether domestic *standards* need to be capable of being over-ridden, the main practical purpose of the over-ride as in the Directive does not apply. That is, the standards are not 'foreign'; they are not made by lawyers, civil servants and politicians; and they are not immutable or impervious to developments in practice. Assuming that Type C rules in standards are more detailed than Type C rules in law, the issue boils down to whether Type A criteria in law should outrank Type C rules in standards *for preparers*. English-speaking regulators have reached the opinion (explicitly or otherwise) that this should not be the case. For example, in the US the SEC requires compliance with standards, and in Australia the law does. As noted above, this is approximately the UK position in practice.

This dislike of the over-ride of standards is due to the fear that preparers would use vague Type A criteria to over-ride Type C rules in order to improve the look of their financial statements. In Australia, the legal over-ride was removed at the suggestion of the standard-setter (McGregor, 1992). In the UK, doubts about the advisability of leaving a lot of discretion with preparers and auditors stem partly from the observation that the TFV was not in practice used to prevent 'creative compliance' in the days before the Financial Reporting Review Panel (Griffiths, 1986; Tweedie and Whittington, 1990; Shah, 1996).

### *2.3. An over-ride written into standards*

Another issue is whether there should be an over-ride written into domestic standards. Again, the main practical purpose of the Directive's over-ride does not seem to apply, because the domestic standard setters are in charge of the rules and can change or interpret them. In the US and Australia, the standards themselves do not contain an over-ride. In the UK, no such over-ride is to be found in SSAP 2 of 1971, although in 1999 the ASB proposed to introduce one (FRED 21, para. 13). This over-ride would be unlikely to be of practical use because of counsel's opinion that compliance would probably be held to be necessary in general in order to give a TFV.

### *2.4. Conclusion on Type A over-ride*

Alexander has two main arguments in favour of making a Type A criterion over-riding. First, he notes that there is '...an almost infinitely wide range of users...enterprises...situations.. decisions' (p.250), so that detailed prescription will not work in forcing financial statements to provide useful information. There seem to be flaws here. It is unclear how the use of an over-riding Type A criterion could help a single set of financial statements to satisfy more of the infinity of needs than the use of over-riding Type C rules would (given that Type A would still be present, requiring disclosures and so forth). Also, as noted above (see sub-section 2.2), any over-riding Type A criterion may be used by some preparers to mislead rather than to inform.

Alexander's second main argument is that:

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[2] In order to give a true and fair view, SSAP 19 requires the annual revaluation of investment properties, with no depreciation. The latter point over-rides the requirement to depreciate all fixed assets with limited useful lives in the Companies Act 1985, Schedule 4, para 18.

[3] It is not necessary to have a specific legal over-ride in order for the legal requirement to give a TFV to over-ride extra-legal standards.

> if regulation is going to be changed...then some *over-riding* criterion greater than that enshrined in regulation itself must, as a matter of logical necessity, be employed to decide on the changes (p.250, emphasis in original)

Taken literally, Alexander scores an own goal here. He appears to be saying that the Type A criterion should not be enshrined in regulation but should be employed by the regulator. I would agree. However, he meant[4] that a Type A criterion greater than the Type C rules should be enshrined in legislation. This, of course, is not a 'logical necessity' because the regulators could use a Type A criterion when making Type C rules whether or not it was enshrined in regulation as over-riding for preparers and auditors.

## 3. IAS 1

I now turn to international standards. I do not wish to defend the detail of E 53 any more than Alexander does (p. 250). However, this does not mean that IAS 1 is right.

Alexander quotes Karel Van Hulle (1997) and Sir David Tweedie[5] as reporting that the US, Canada, Australia and Germany were against an over-ride in IAS 1, whereas the UK and most other Europeans were in favour. The reports are slightly inaccurate. The Scottish representative on the IASC Board (Sir David) did indeed speak passionately in favour of an over-ride, but the English representative[6] spoke passionately against.

The arguments against an over-riding Type A (e.g. TFV) criterion relating to a domestic standard (purpose (vi) in Section 2) have been made above. First, TFV can still be used by preparers for purposes (i) to (iv). Second, TFV can still be the over-riding criterion for standard setters (purpose (v)). Third, one can still have an over-riding TFV for Type C legal rules in law (purposes (vii) and viii)). Fourth, the experience of standard setters in the English-speaking world (including the UK) suggests that it is a bad idea to allow preparers a means to break standards. One should not lightly dismiss the views of experienced standard setters in the US, Canada and Australia; and one should judge the ASB by its domestic actions (i.e. obtaining and publishing counsel's opinion, as examined above) rather than by its international words. These standard setters have observed that, particularly in the absence of a strong oversight and enforcement mechanism, for every case where a TFV over-ride of a standard would force a preparer to depart from a 'wrong' Type C rule, there would be dozens where a preparer would contrive to depart from a 'right' Type C rule. So, this form of the over-ride would make finanical reporting worse.

An alternative approach to allowing the rare necessity of an over-ride of Type C rules is for preparers to disclose the problem and its effects, even to the extent of pro forma financial statements. If the issue is substantial and not extremely rare, then the standard setters can change the Type C rule or issue an interpretation of it.

The case against a TFV over-ride becomes even stronger in an international standard than in a domestic standard. Alexander reports (p. 245) that he and I have separately argued that there are many European meanings to TFV; but that other writers have argued that there is one 'European TFV' which might be different from a British TFV. Either way, there is agreement that the interpretation of TFV differs internationally. It seems clear, too, that there is greater scope for international variation in the interpretation of a Type A criterion than of a Type C rule. Consequently, a Type A over-ride in IAS 1 will be interpreted with even more variance internationally than nationally, so that Type C rules will be over-ridden to different degrees and in different ways in different places even in similar circumstances. Users of sets of financial statements prepared in different countries but all under IAS rules would presumably prefer to reduce such differences.

A second international issue concerns oversight and enforcement. The cost of a Type A over-ride in standards (i.e. abuse of it) is likely to be minimised if there is an effective oversight and enforcement mechanism. To the extent that there is an over-ride of the Type C rules of standards in the US or the UK (see above, and Alexander, Sections 3 and 6), it is now little abused (or even used) because of legally backed oversight and enforcement in the respective countries by the Securities and Exchange Commission and the Financial Reporting Review Panel. There is presently no such body on an international basis to oversee and enforce the IASC's package of standards and interpretations (called IAS GAAP, below), as has been lamented by the World Bank and others.[7] This increases the likelihood of abuse.

Incidentally, although IAS GAAP lacks a specific legal context for a Type A over-ride to be written into, this does not mean that an over-ride has therefore to be put into IAS GAAP itself. As noted above, four of the uses of the Type A criterion for preparers (see points (i) to (iv) of Section 2) do not rely on an over-ride, and two other uses (points (vii) and (viii)) are not relevant in the absence of a specific legal context. The remaining use for preparers (i.e. for the over-ride of Type C rules in standards) is the one that I believe is inappropriate anyway. For standard setters with no specific legal context, insertion of an over-ride into standards is also not appropriate, given that standards are addressed to preparers and auditors, not to standard setters. For the latter, the Type A criterion can be made paramount in other ways, such as being written into a conceptual framework.

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[4] Confirmed by David Alexander in correspondence of 19 October 1999.

[5] 'SEC miffed at UK Victory'. *Accountancy*, August: 17.

[6] That is, the present author.

[7] 'Big five on board—just'. *Accountancy International*, July: 7.

In addition to the above arguments against an over-ride in IAS 1, there was the political point that inserting an over-ride would be used by those opposed to IOSCO[8] endorsement of IAS GAAP to suggest that the standards were so loose that they contained an in-built non-compliance device (e.g. FASB, 1999, p.47). There is no reason to criticise Alexander for not including this in his logic, but it is relevant in the wider scheme of things for those who believe that the spread of IAS GAAP would be likely to improve accounting around the world.

Fortunately, the problem with IAS 1 was mitigated in the final drafting discussions by adding a requirement to disclose the reasons for departure and details of the financial effect (IAS 1, para. 13 (c) and (d)). It might be concluded that there is little difference between (i) breaking a Type C rule with a full financial explanation of why this is necessary to comply with a Type A criterion, and (ii) complying with a Type C rule with a full financial explanation of how different things would have looked if one had complied with the Type A criterion. In a world of universally honest preparers, fully independent auditors and fully effective overseers, one might be comfortable with indulging a philosophical preference for the former. However, for practical and political reasons, the latter might have been better.

## 4. Examples of Type A/Type C conflict

Some examples may be useful to illustrate the dangers of Type A over-ride in standards. IASs are chosen as the context.

IAS 12 (paras. 15 and 53) imposes Type C rules whereby an enterprise must account for deferred tax on a temporary difference arising on the revaluation of an asset; and the amount should not be discounted. Some British preparers and auditors (and standard setters) claim[9] that this is 'wrong', particularly in the normal case where there is no intention to sell the asset and where anyway roll-over relief could be claimed to postpone any tax on a capital gain. It is 'wrong' because the resulting credit balance would not meet the definition of a liability, [10] in that there is no obligation to a third party at the balance sheet date. Furthermore, for such a long-dated 'liability', it is badly misleading not to discount it, particularly given the requirement to discount pension liabilities (IAS 19, para. 54) and other types of provisions (IAS 37, para. 45). One could argue that zero would be a better estimate of any liability rather than the full nominal amount. Presumably, the consciences (or inclinations) of British preparers or auditors might therefore require them to use the Type A over-ride in IAS 1 in order to disobey the Type C rules of IAS 12.

As a second example, IAS 19 (para. 83) contains a Type C requirement to take account of estimated future pay rises when calculating defined benefit pension liabilities. Some German preparers and auditors claimed[11] that this is 'wrong' because there is no obligation to make the pay rises. This seems to be a mistaken[12] argument, but that is not the issue here.

If preparers or auditors honestly believe (or can plausibly claim to believe) that a Type C rule leads to 'wrong' accounting, then Alexander and IAS 1 would require them (or, in the bracketed case, allow them) to break the Type C rule in order to comply with the Type A criterion. If this hierarchy were taken literally and seriously, chaos would result. British companies could break IAS 12 and German companies could break IAS 19 while still claiming compliance with IAS GAAP. It would be difficult for auditors to qualify their opinions, even if they wanted to; and there would be no oversight/enforcement mechanism beyond that.

## 5. Conclusion

While agreeing with many of Alexander's arguments and conclusions, I challenge Alexander's conclusions that Type A criteria should over-ride Type C rules in standards, and that IAS 1 is therefore a good standard in this respect. The problem arises because of the lack of sufficient distinction in the following cases:

i. between a Type A over-ride in law and one in standards;

ii. between a Type A supremacy for regulators and a Type A over-ride for preparers;

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[8] International Organization of Securities Commissions, whose members include the Securities and Exchange Commission of the US.

[9] The following were arguments used by the UK representatives on the Board of the IASC during the debate leading up to IAS 12 (revised). Such arguments can also be seen in British and the other submissions to the IASC on E 49, which are on public record.

[10] IASC, *Framework*, paras. 49, 60, 91.

[11] See, for example, FEE (1999), p.40.

[12] This is mistaken because the existence of an obligation is necessary to establish that there is a liability (*Framework*, para 49) rather than to measure the size of the liability. There is no doubt that there is a pension liability in this case (irrespective of future pay rises); the issue is how to arrive at the best estimate of it. There is a probability that there will be future pay rises, so they need to be taken into account in the estimations.

and
iii. between a national setting and an international setting.

Consequently, Alexander's two main arguments (inflexibility/stultification and change to regulation) do not work. First, Type C rules in law may be stultified but this is not necessary for standards. The latter can be changed reasonably quickly or an interpretation can be issued. In the meantime, supposing that the standard setters had already been using a Type A criterion to make the Type C rules, flexibility in terms of a Type A over-ride for preparers would be likely to entail higher costs in terms of abuse than benefits in terms of a rare case of better accounting. Secondly, although supremacy of a Type A criterion is necessary for coherent change to Type C rules, it is necessary in the minds of the regulators not as an over-ride for preparers.

The arguments in this comment paper suggest the following:

a) A Type A criterion is useful in law or standards or both, so that preparers and auditors can interpret Type C rules, choose between options in them and fill gaps.

b) A Type A criterion should be used by legislators or standard setters when making Type C rules. (Obviously this means that Type A overrides Type C.)

c) Within a law, a Type A over-ride of the law's Type C rules is useful, assuming that there are reasonably detailed Type C rules in standards.

d) The law should not contain a Type A override of Type C rules in standards, or at least there should be a strong legal presumption in favour of standards and an effective oversight or enforcement mechanism.

e) Standards should not contain a Type A override of Type C rules in standards.

f) Conclusion (e) applies particularly if there is no effective oversight or enforcement mechanism.

g) Conclusion (e) applies particularly in an international setting where the Type A criterion would be interpreted variously.

In the US, (a), (b)[13] and (e)[14] are complied with, and the rest are not relevant.[15] In Australia, (a), (b), (d) and (e) are complied with, and the rest are not relevant (including (c) because there are a few Type C rules in law). In Canada, standards are inserted into law and there is an over-ride which is at least as restricted and overseen as that in the UK. Consequently, (a) to (e) are in effect complied with. Furthermore, in Australia and Canada, standards are specifically mandatory by law, which is effectively the US position because of the SEC's requirements. In the UK, (a), (b), (c) and (d, second option) are complied with. At the time of writing, so is (e), and in effect this will continue, as noted in Section 2.3. As in the other countries, (f) and (g) are not relevant. Consequently, all these countries satisfy my desiderata. IAS 1 is the odd one out. There is compliance with (a) and (b), and (c) and (d) are not relevant. However, (e) is broken, which is particularly serious given that (f) and (g) are relevant. Fortunately, the problem with IAS 1 is mitigated by the compulsory disclosures.

None of the above arguments should be construed as implying that the TFV is a bad idea. Clearly, the ultimate objective must be for financial statements to give useful information (presumably implied by giving a TFV) rather than to obey a set of rules. The argument here is that, on balance, the former is more likely to be achieved by specifically demanding the latter with no exceptions. This is particularly the case in the present international setting.

Also, it is not intended to imply that standard setters are perfect. For example, the above suggestion that the English-speaking standard setters comply with my desideratum (b) by *using* a Type A criterion does not mean that they always publish the 'right' Type C rules. Sometimes the standard setters are overcome by practical or political considerations. However, it *is* implied here that the standard setters are more likely to make (and amend where necessary) Type C rules that contribute to a TFV than are parliaments or lawyers, and that across-the-board compliance is more likely to maximise the output of useful and comparable information than leaving the interpretation of TFV (and any resulting departure from rules) to individual preparers and auditors.

## References

Alexander, D. (1999). 'A benchmark for the adequacy of published financial statements'. *Accounting and Business Research*, 29 (3): 239–253.

FASB (1999). *The IASC-US Comparison Project*, Financial Accounting Standards Board.

FEE (1999). *Comparison of the EC Accounting Directives and IASs*, FEE.

Griffiths, I. (1986). *Creative Accounting: How to Make Your Profits What You Want Them to be*, Sidgwick and Jackson.

Hopwood, A. (1990). 'Ambiguity, knowledge and territorial claims: Some observations on the doctrine of substance over form: a review essay'. *British Accounting Review*, March: 79–87.

McGregor, W. J. (1992). 'True and fair—an accounting anachronism'. *Australian Accountant*, February: 68–71.

Nobes, C. W. (1993). 'The true and fair view requirement: impact on and of the fourth directive'. *Accountant and Business Research*, Winter: 35–48.

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[13] Although Alexander notes (p.248) that 'fair presentation' need not be used by the FASB, there are other statements of purpose (i.e. Type A criteria) in the FASB's Framework.

[14] To the extent that (e) is not complied with because of AICPA rule 203 (Alexander, p. 248) then this is sorted out by SAS 69 and because (f) does not apply.

[15] Because of the lack of Companies Acts (points (c) and (d)), because of the SEC (point (f)) and the domestic context (point (g)).

Shah, A. (1996). 'Creative compliance in financial reporting'. *Accounting Organizations and Society*, 21 (1): 23–39.

Tweedie, D. and Whittington, G. (1990). 'Financial reporting: current problems and their implications for systematic reform'. *Accounting and Business Research*, Winter: 87–102.

Van Hulle, K. (1997). 'The true and fair over-ride in European Accounting directives'. *European Accounting Review*, 6 (4): 711–720.

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# Detecting earnings management using cross-sectional abnormal accruals models

## K.V. Peasnell, P.F. Pope and S. Young*

**Abstract**—This paper examines specification and power issues in relation to three models used to estimate abnormal accruals. In contrast to the majority of prior work evaluating models estimated in time-series, we examine the performance of cross-sectionally estimated models. In addition to testing the standard-Jones (Jones, 1991) and modified-Jones (Dechow et al., 1995) models, we also develop and test a new specification, labelled the 'margin model'. Consistent with prior US research employing time-series specifications of the two Jones models, our findings suggest that each of the three cross-sectional models are well specified when applied to a random sample of firm-years. However, the margin model appears to generate relatively better specified estimates of abnormal accruals when cash flow performance is extreme. Analysis of the models' ability to detect artificially induced earnings management indicates that all three procedures are capable of generating relatively powerful tests for economically plausible levels of accruals management (e.g., less than 10% of lagged total assets). Regarding their relative performance, the standard-Jones and modified-Jones models are found to be more powerful for revenue and bad debt manipulations. In contrast, the margin appears to be more powerful at detecting non-bad debt expense manipulations.

## 1. Introduction

An important issue in financial reporting is the extent to which managers manipulate reported earnings. Following Healy (1985), accruals-based measures are now widely employed in tests of the earnings management hypothesis. A significant obstacle associated with the implementation of this approach, however, is the need to accurately separate reported accruals into their managed (discretionary) and unmanaged (non-discretionary) components.[1] The most frequently used techniques for achieving this separation are the cross-sectional versions of the standard-Jones model (Jones, 1991) and the modified-Jones model (Dechow et al., 1995). However, recent evidence reported by Guay et al. (1996), Dechow et al. (1995) and Kang anc Shivaramakrishnan (1995) for the US suggest that time-series versions of both models estimat discretionary accruals with considerable imprecision. These findings have led these and other researchers to question the reliability of the emergin body of empirical evidence concerning accrual manipulation and its determinants. However, it i premature to reach such a conclusion based o tests of time-series models when cross-sectiona procedures are now more widely employed i earnings management research.

This paper adds to the existing body of work i this area by providing evidence on the performance of three alternative cross-sectional procedure for estimating the managed component of workin capital accruals. In addition to examining th performance of the standard-Jones and modified Jones cross-sectional models, we also develop an test a new cross-sectional procedure, which we label the 'margin model'.[2] Following Dechow et al (1995), model performance is evaluated in terms o specification (i.e., the probability of a Type I error) and power (i.e. the probability of a Type II error). Using a sample of UK non-financial companies, our results suggest that all three procedures are well specified when applied to a random sample of firm-years. Additional tests suggest that the margin model is relatively better specified when cash flow performance is extreme. We assess the power of each model to detect accrual management using simulation procedures that allow for three different forms of earnings management: revenue manipulation, expense manipulation (excluding bad debts) and bad debt manipulation. Our findings suggest that all three procedures are capable of generating reasonably powerful tests for economically plausible levels of all three forms of accruals management. However, important differences in the relative power of the models are evident. In particular, the standard-Jones and modified-Jones models are shown to be substantially more powerful at detecting revenue and bad debt manipulations. In contrast, the margin model is better at detecting non-bad debt expense manipulations.

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[1] Following conventional practice, we use the terms 'managed accruals', 'discretionary accruals' and 'abnormal accruals' interchangeably throughout the remainder of the paper. Similarly, we also use the terms 'unmanaged accruals', 'non-discretionary accruals' and 'normal accruals' interchangeably.

[2] Kang and Shivaramakrishnan (1995) develop a model tha uses an instrumental variables technique to isolate the discretionary component of total accruals. Based on simulation results, they present evidence that their model is more powerfu than the standard-Jones model at detecting abnormal accruals We do not, however, evaluate this model in the present paper Other than in the original Kang and Shivaramakrishnan (1995 paper, we are not aware of any published earnings managemen study that has used this procedure to estimate accrual manipulation. Moreover, the original time-series formulation of th procedure is not amenable to the cross-sectional estimatio techniques that are the focus of this paper.

The paper contributes to the literature in three ways. First, as already noted and in contrast to the studies by Guay et al. (1996), Dechow et al. (1995) and Kang and Shivaramakrishnan (1995) that examine time-series versions of the models, we evaluate cross-sectional specifications. Second, we develop an alternative abnormal accrual model which is found to generate different estimates of earnings management to the s-J and m-J procedures under certain conditions. Third, our results offer some practical guidance for detecting earnings management activity. In particular, our findings suggest either that the choice of accrual model should depend on the predicted form of earnings management activity (e.g. revenue-based or expense-based), or that the use of several models in combination may afford the best opportunity of detecting accrual management, the specific form of which is unpredictable.

The remainder of the paper is organised as follows. Section 2 presents a brief review of the standard-Jones and modified-Jones models and develops our alternative model for estimating abnormal accrual activity. Section 3 provides details of the research design and sample selection procedure. Section 4 presents our empirical findings. Section 5 contains a summary and conclusions.

## 2. Modelling abnormal accruals

### *2.1. The standard-Jones and modified-Jones procedures*

The original specification of the standard-Jones model (Jones, 1991) uses a two-stage approach to partition total accruals into their managed and unmanaged components.[3] In the first stage, total accruals (TA) are regressed on the change in sales (ΔREV) and the gross level of property, plant, and equipment (PPE) for each sample firm, using the longest available time-series of data immediately prior to the 'event' year. In the second stage, the estimated parameters from this regression are combined with TA, ΔREV and PPE data from the event year to determine the abnormal component of total accruals. The intuition underlying the choice of PPE and ΔREV as explanatory variables in the first-stage regression is that they help to control for unmanaged accruals associated with the depreciation charge and changes in economic activity, respectively.[4]

As Dechow et al. (1995) discuss, a weakness of the standard-Jones specification lies in its inability to capture the impact of sales-based manipulation, since changes in sales are assumed to give rise to non-discretionary accruals. In an attempt to capture sales-based manipulations, Dechow et al. (1995) proposed a modification to the standard-Jones model. The modified-Jones model is identical to the standard-Jones model, with the exception that the change in debtors (ΔREC) is subtracted from ΔREV at the second stage. In effect, the model therefore implicitly assumes that all changes in credit sales in the event period result from earnings management.[5] In tests comparing the power of the modified-Jones model with that of the standard-Jones model, Dechow et al. (1995) find that the former procedure is indeed significantly better at detecting sales-based earnings management. However, in absolute terms, both models are found to generate tests of low power for earnings management of economically plausible magnitudes (e.g. accruals of 1% to 5% of total assets). In addition, both models are shown to be poorly specified when financial performance is extreme, with each generating a significant proportion of Type I errors when applied to firms with extreme cash flows. These results cast doubt on the effectiveness of both the standard-Jones and modified-Jones models, estimated in time-series, at isolating accruals manipulation. Consistent with this sceptical view, Guay et al. (1996) evaluate the time-series standard-Jones and modified-Jones models using a market-based procedure and conclude that neither procedure generates a reliable measure of accrual management.

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[3] In the discretionary accruals literature, total accruals are typically defined as the change in non-cash working capital accounts, minus depreciation and amortisation.

[4] The coefficient on PPE is predicted to be negative since the level of property, plant and equipment is linked to the income-decreasing depreciation accrual. In contrast, the predicted sign for the ΔREV coefficient is more ambiguous since a given change in sales can cause income-increasing changes in some working capital accounts (e.g. trade debtors) and income-decreasing changes in others (e.g. trade creditors). The ambiguous predictions for the estimated coefficient on ΔREV highlights the somewhat ad hoc nature of the model. For her sample of 23 firms facing import relief investigations by the United States International Trade Commission, Jones reports an insignificant positive mean coefficient on ΔREV (0.035) and a significant negative mean coefficient on PPE (−0.033).

[5] As Beneish (1998) discusses, to the extent that $\Delta REV_t - \Delta_t REC$ can be rewritten as $CR_t - REV_{t-1}$, where $CR_t$ equals cash received in period *t*, the modified-Jones model lacks clear economic intuition.

In an attempt to refine and improve the original formulation of the standard-Jones model, Teoh et al. (1998) and DeFond and Jiambalvo (1994) focus exclusively on the working capital component of total accruals. As Beneish (1998) and Young (1999: 842) discuss, this formulation is potentially more appealing since continuous (i.e., year-on-year) earnings management via the depreciation accrual is likely to have limited potential due to its visibility and predictability. In addition, Young (1999) reports that Jones-style models based on a measure of total accruals (i.e., inclusive of the depreciation charge) induce substantial measurement error in the resulting estimate of managed accruals.

Finally, as a practical matter, the original time-series formulation of the standard-Jones and modified-Jones models has proven restrictive when implementing the procedures empirically because of the need for a sufficiently long time-series of data to allow effective estimation of the first-stage regression parameters. This requirement raises several concerns. First, issues of survivorship bias naturally arise.[6] Second, the assumption that the coefficient estimates on ΔREV and PPE remain stationary over time may not be appropriate. Finally, the self-reversing property of accruals may introduce specification problems in the form of serially-correlated residuals. In an effort to overcome these problems, recent studies use cross-sectional versions of the models (e.g., Becker et al., 1998: Subramanyam, 1996; DeFond and Jiambalvo, 1994). Under this approach, the first stage regression is estimated separately for each industry-year combination, after which the resulting industry- and time-specific parameter estimates are combined with firm-specific data to generate estimated discretionary accruals. These cross-sectional versions of the standard-Jones and modified-Jones models now dominate the earnings management literature.[7] However, little research has been conducted to date that evaluates the effectiveness of such models at detecting earnings management.[8]

### 2.2. *The margin model*

In this section, we derive an alternative cross-sectional procedure for estimating abnormal accruals. Similar to the standard-Jones and modified-Jones procedures, we estimate abnormal accruals using a two-stage procedure, where the first stage involves regressing accounting accruals on a vector of explanatory variables designed to capture unmanaged accruals. In contrast to the two Jones models, however, the explanatory variables included in our first-stage regression are derived from a formal model linking sales, accruals and earnings.[9] Following the discussion in the preceding section, we exclude depreciation from our measure of accruals on the grounds that this item represents an unlikely or unsuitable vehicle for systematic earnings management. The starting point for our model is therefore working capital accruals. We then seek to model 'normal' changes in the following three key working capital accrual components: stocks (ΔSTOCK), debtors net of bad debt allowance (ΔDEBT), and creditors (ΔCREDIT). The remaining non-cash components of working capital are not explicitly modeled because of their diverse natures.

Ignoring for the moment such expenses as wages and rent, we define the following three components of changes in working capital:

$$\Delta STOCK \equiv PUR - COGS \tag{1}$$

$$\Delta DEBT \equiv REVC - CRC - BDE \tag{2}$$

$$\Delta CREDIT \equiv PUR - CPS \tag{3}$$

where PUR is purchases of materials, COGS is cost of finished goods sold, REVC is revenue from credit sales, CRS is cash received from customers, BDE is the bad debt expense, and CPS is cash paid to suppliers. Note that while ΔSTOCK in (1) includes inventories of materials, work in progress and finished goods, all intermediate transfers between these inventory categories involve cancelling entries that can be ignored when the inventories are aggregated. Next, we write working capital accruals (WCA) as:

$$\begin{aligned} WCA = {} & (\Delta STOCK + \Delta DEBT) - \Delta CREDIT \\ & + OTHER = \end{aligned}$$

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[6] For example, Jones (1991) requires that her sample firms have at least 10 time-series observations.

[7] One should not interpret the current preference for cross-sectional models in the literature as evidence of their improved ability to detect earnings management. It is important to recognise that the replacement of time-series models by their cross-sectional counterparts introduces new problems. For example, cross sectional models are less likely to capture the effects of (a) mean reversion in accruals, (b) dynamic accrual management strategies, and (c) industry-wide earnings management. With valid arguments for and against both estimation approaches, the relative power of cross-sectional and time-series models to detect earnings management remains an open empirical question that is largely beyond the scope of the present paper.

[8] An exception is the study by Jeter and Shivakumar (1999) which evaluates cross-sectional models using quarterly and annual data for a sample of US firms.

[9] Our model is consistent with that developed by Dechow et al. (1998).

$$\begin{aligned}&(REVC - COGS \\ &- BDE) + (CPS - CRC) + OTHER \\ &= sm \cdot REVC - cm \cdot CRC + OTHER \qquad (4)\end{aligned}$$

where sm equals the gross margin on recorded sales, cm equals the gross cash contribution on cash collections from customers, and OTHER includes all non-cash current assets other than stocks and trade debtors and all current liabilities other than creditors. We assume OTHER is orthogonal to REVC and CRC in equation (4).

Equation (4) is intended to capture the accrual recognition process before 'contamination' by earnings management. Working capital is expressed as the sum of two contribution margins: the gross margin on sales and its cash flow analogue, the margin on cash received (the 'cash margin'). Under this approach, working capital accruals that do not result from sales and cash collections in the period are classified as 'abnormal' in nature and are considered the most likely manifestation of earnings management.

Equation (4) is implemented empirically using the following cross-sectional OLS regression:[10]

$$WCA_t = \lambda_0 + \lambda_1 REV_t + \lambda_2 CR_t + \eta_t, \qquad (5)$$

where REV is total sales (*Datastream* item 104) and represents our proxy for REVC, CR is total sales minus the change in trade debtors (*Datastream* items 104 − Δ370) and represents our proxy for CRC, $\lambda_0$, $\lambda_1$ and $\lambda_2$ are regression coefficients and $\eta_t$ is the regression residual. The $\lambda_1$ coefficient represents an estimate of the sales margin and is predicted to be positive, while the $\lambda_2$ coefficient represents an estimate of the cash margin and is predicted to be negative. We refer to this procedure as the 'margin model' in the remainder of the paper. The primary difference between the margin model and the standard-Jones and modified-Jones models is that the margin model disaggregates the change in revenue term into two components at the parameter fitting stage, substituting cash receipts in the current period for revenues in the prior period. The primary advantage of this approach is its improved economic intuition, which should, in turn, lead to a more precise estimate of normal accruals. The downside, relative to the modified-Jones procedure, is that unmanaged accruals are computed using a variable (REV) that may itself be contaminated by earnings management. As such, we anticipate that the margin model will be less powerful than the modified-Jones model at detecting revenue-based manipulations — a prediction that we test empirically in Section 4.

## 3. Research design

### 3.1. *Estimation of accruals models*

Our empirical tests compare the specification and power of commonly used test statistics across measures of abnormal accruals generated by the standard-Jones (s-J), the modified-Jones (m-J) and the margin models. To ensure comparability with the margin model, both the s-J and m-J models are formulated using working capital accruals (e.g., Teoh et al., 1998; DeFond and Jiambalvo, 1994).[11] The first-stage regressions are estimated cross-sectionally for each industry (*Datastream* level-6) and year combination using all firms with available accrual data on the *Datastream* 'Live' and 'Dead' stocks files. This yields the set of coefficient estimates for a given industry-year combination for each model which are then subsequently used in the computation of abnormal accruals, described in the following subsection. The primary purpose of this industry-year procedure is to reduce the probability that our estimates of abnormal accruals are 'contaminated' by time effects (e.g. interest rate and other macroeconomic factors) and industry effects. An additional benefit of this procedure is that it dampens down the influence of particular instances of unobservable earnings management on the parameter estimates of normal accruals. A drawback of such cross-sectional methods is that they introduce noise into the parameter estimation, to the extent firms differ structurally within the industry. All variables (with the exception of the intercept) are scaled by lagged total assets to reduce heteroskedasticity.[12] Industry-year portfolios containing fewer than 10 observations are dropped from the analysis to ensure more efficient estimation of the regression coefficients.

### 3.2. *Empirical test procedures*

The following subsections describe the procedures employed to assess model specification and power for the three abnormal accrual models described in Section 2.

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[10] While there is no obvious conceptual reason why the margin model could not be estimated using time-series procedures, this is not the focus of the present paper.

[11] Working capital accruals are defined as the change in non-cash current assets minus the change in current liabilities, excluding the current portion of long-term debt [*Datastream* items Δ(376 − 375) − Δ(389 − 387)].

[12] As such, the s-J and m-J models reported in this paper differ slightly from those estimated in extant studies where the intercept is also scaled by total assets and the resulting regression is estimated with the true constant term suppressed. We did not adopt this approach in the current paper for two reasons. First, there is no theoretical reason for forcing the regression through the origin (e.g., we have no reason to believe that total accruals will be zero when, say, ΔREV is zero). Secondly, regressions estimated with the constant suppressed preclude an analysis of the goodness-of-fit of the models because the associated R-square values are unreliable. However, to ensure comparability with extant research, we repeated all tests using this alternative specification. In all cases the conclusions were identical to those based on the findings reported in Tables 2–5.

### *3.2.1. Model specification*

We evaluate model specification by examining the extent to which each of the three cross-sectional models incorrectly rejects the null hypothesis of no earnings management. This is achieved using the following procedure outlined in Dechow et al. (1995: 200):

- *(a)* Estimate the first-stage regressions for each of the three models (s-J, m-J and margin) for each *Datastream* level-6 industry group in year *t*, as previously described in subsection 3.1;
- *(b)* Select 25 firms at random from year *t* and construct an indicator variable (PART), defined as one if the firm has been selected and zero otherwise;
- *(c)* Randomise all observations in year *t* and compute abnormal accruals (AA) for each of the three models using the coefficient estimates obtained in (a);[13]
- *(d)* Estimate the following univariate regression for each measure of abnormal accruals

$$AA_i = \alpha + \beta PART_i + \varepsilon_i \qquad (9)$$

  and test whether the estimated coefficient on PART is significantly different from zero;
- *(e)* Repeat steps (a)–(d) 100 times for each sample year.

As noted by Dechow et al. (1995: 200), the steps outlined above are designed to investigate whether the estimated abnormal accruals are statistically well-specified. Since the observations at stage (b) are selected at random, they should not be characterised by any systematic earnings management activity. As such, a well-specified model is not expected to reject the null hypothesis of $\beta = 0$ at rates that significantly exceed the appropriate test statistic (e.g., 5% or 1% levels). Accordingly, we interpret rejection frequencies close to (significantly different from) the specified test level as evidence that the accrual model in question is well (poorly) specified.

In addition to testing for general model specification using a random sample of observations, we also evaluate model specification when financial performance (measured using operating cash flows) is extreme. Our tests exploit the fact that estimated abnormal accruals may be decomposed into two components, 'true' earnings management and measurement error. Since the true earnings management component is invariant to the specific modelling procedure employed, any observed difference in estimated abnormal accruals across alternative procedures must be attributable to measurement error. As such, a comparison of the distributional properties of abnormal accruals generated by alternative models (for the same set of firms) provides a means of evaluating their *relative* specification.[14] In the context of extreme cash flow performance, prior research has found that unusually high (low) operating cash flows cause estimated discretionary accruals to be negatively (positively) biased (Young, 1999; Dechow et al., 1995). Accordingly, average abnormal accruals estimated using a model that controls for high (low) cash flows are expected to be less negative (less positive) than abnormal accruals estimated using a procedure that affords little effective protection against extreme cash flow performance, all else equal. The test is implemented by forming decile portfolios, ranked within each sample year, based on operating cash flow scaled by lagged total assets.[15] Abnormal accruals for each decile portfolio are then computed using the three cross-sectional models. Finally, mean and median abnormal accrual estimates generated by the three models are compared within each cash flow decile.[16] It is important to note that since the three abnormal accrual models are evaluated using the same subsample of firms, any observed differences in the distributional properties of estimated abnormal accruals must be due to differences in the models rather than omitted firm-specific factors.

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[13] For the s-J and margin models, abnormal accruals are simply defined as the regression residuals from stage (a). For the m-J model, on the other hand, the adjustment to $\Delta REV$ by $\Delta REC$ occurs after the parameter estimation stage and hence the abnormal accruals are different from the first-stage regression residuals.

[14] While this approach allows direct comparisons of the *relative* magnitude of the measurement error associated with alternative accrual models, a limitation of the procedure is that it affords no measure of the *absolute* level of misspecification.

[15] Operating cash flow is measured as operating profit (*Datastream* item 137) minus working capital accruals (*Datastream* items $\Delta 376 - \Delta 375 - \Delta 389 + \Delta 387$), plus depreciation and amortisation (*Datastream* items 402+562).

[16] Using a procedure equivalent to that employed to test for general model specification, Dechow et al. (1995) evaluate model specification when cash flows are extreme by examining observed rejection frequencies for samples of firms selected from the top and bottom deciles of the operating cash flow distribution. We do not tabulate results based on this approach in the current paper because as Guay et al. (1996) discuss, the test is based on the assumption of no earnings management. While this asssumption is expected to hold for the random samples used to test for general model misspecification, it is unlikely to hold in the case of firms with extreme cash flow performance, given the strong incentives for earnings management faced by these firms. For completeness, however, we did perform such tests. Consistent with Dechow et al. (1995), rejection frequencies for all three models significantly exceeded the specified test level for both the high and low cash flow partitions. However, the rejection frequencies for the margin model were always lower than those obtained for the s-J and m-J models, consistent with the view that the margin model is *relatively* better specified when cash flows are extreme.

### *3.2.2. Power to detect earnings management*

We assess the power of alternative cross-sectional accruals models by examining their ability to detect earnings management activity when it is known to exist, in the sense that it is artificially induced (rather than actual earnings management by the firms concerned). This is achieved by adding a pre-determined positive amount to the reported accruals of a randomly selected set of firms and then examining the ability of the models to detect this artificial earnings management. The procedure is similar to that described in subsection 3.2.1 for testing general model specification, with the exception that at stage (b), artificial income-increasing accruals are added to the reported accruals for firms where PART equals one.[17] As before, steps (a)–(d) are then repeated 100 times for each sample year. However, since the observations where PART equals one are now known to contain income-increasing earnings management activity, we would expect a powerful model to reject the null hypothesis that $\hat{\beta}=0$, in favour of the alternative that $\hat{\beta}>0$, at rates that significantly exceed the specified test level. All else equal, the higher the rejection frequencies associated with a particular model, the more powerful that model is deemed to be at detecting earnings management activity.

In implementing this procedure, we experiment with different magnitudes of income-increasing accruals ranging from 0% to 100% of firms' lagged total assets in the randomly-selected PART treatment firms. In addition, we also consider three different types of accruals manipulation:

(a) *Expense Manipulation (excluding bad debts)* — e.g. delayed recognition of an expense (Dechow et al 1995: 201). This approach is implemented by adding an assumed amount of expense manipulation to working capital accruals.[18]

(b) *Bad Debt Manipulation* — e.g. write-back of an existing bad debt provision. This approach is implemented by adding the assumed amount of bad debt manipulation to both working capital accruals and trade debtors.

(c) *Revenue Manipulation* — e.g. premature recognition of a sale, assuming all costs are fixed (Dechow et al., 1995: 202). This approach is implemented by adding the assumed amount of revenue manipulation to working capital accruals, total sales and trade debtors.

### *3.3. Sample*

The starting point for our sample is the population of firms on the *Datastream* 'Live' and 'Dead' stocks files with the necessary accounting data for the computation of the s-J, m-J and margin models and which have year-ends between 30 June 1990 and 31 May 1997. From this initial sample, we exclude all financial firms because *(a)* their financial reporting environments differ from those of industrial firms and *(b)* they have fundamentally different accrual processes that are not likely to be captured well by our expectations models of normal accrual activity. Firm-years with missing *Datastream* level-6 industry codes are also omitted. Since the estimation of our cross-sectional accrual models requires at least 10 firms per industry-year combination, we also exclude all *Datastream* level-six industry groups with fewer than 10 observations in a given sample year. Finally, because the distribution of working capital accruals is characterised by a small number of extreme observations, we also exclude all cases for which scaled working capital accruals lie outside the one and 99 percentiles.

These sampling criteria result in a final sample of 4,352 firm-year observations, comprising 837 individual firms from 35 *Datastream* level-6 industry groups. Of these, 418 firms (49.9%) are represented in all seven years, while 572 firms (68.3%) are represented at least five times. Firms with only a single year of data number 78 (9.3%). Annual sample sizes are 601, 590, 607, 580, 624, 657 and 693 for 1990, 1991, 1992, 1993, 1994, 1995 and 1996, respectively. The largest industry group in any given year is general engineering, with the number of firms ranging from 51 in 1993 to 57 in 1996. Details of the sampling procedure are reported in Table 1.

## 4. Results

### *4.1. Descriptive statistics*

Table 2 presents descriptive statistics for the (standard and modified) Jones and margin models. Panel A reports the coefficient estimates and associated fit statistics for the first-stage regressions. Panel B presents additional information for the industry-year estimated portfolios, partitioned according to the goodness-of-fit of the regressions estimated in Panel A. Since the s-J and m-J models are equivalent at the estimation stage, Table 2 reports only a single set of results for these two models in the columns headed 'Jones Models'. Examination of the coefficient estimates and associated goodness-of-fit statistics presented in panel A provides preliminary evidence regarding the models'

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[17] As such, the parameter estimates from the first stage regressions in part (a) are not contaminated by the artificially induced earnings management.

[18] Unlike Dechow et al. (1995) and Kang and Shivaramakrishnan (1995), because our models are estimated cross-sectionally, we do not have to make corresponding adjustments for accrual reversals in future accounting periods. This holds for all three types of accrual manipulation examined.

**Table 1**
**Sample selection criteria. The sample period comprises all non-financial firms on the *Datastream* 'Live' and 'Dead' stocks files with year-ends between 1 June 1990 and 31 May 1997 (inclusive)**

| *Criteria* | | *Firm-years* |
|---|---|---|
| Firm-years with non-missing accrual data: non-financials only | | 4,600 |
| Less: | Extreme accrual values (trimmed at 1% and 99% levels) | (101) |
| | Industry-year combinations with fewer than 10 observations | (81) |
| | Missing *Datastream* level-6 industry codes | (66) |
| Final sample | | **4,352** |

ability to capture, and hence control for, normal working capital accrual activity. For the Jones models, the coefficient on ΔREV is positive in all years, with the exception of 1994. However, the average magnitudes of the $\beta$s are generally very low, ranging from a high of 0.068 in 1993 to a low −0.007 in 1994. The associated *t*-statistics highlight the lack of association between working capital accruals (WCA) and the ΔREV term for our sample: median *t*-statistics for the industry-specific estimates of $\beta$ never attain significance in any of the seven estimation periods. The lack of association between WCA and ΔREV is also reflected in the explanatory power of the models: the median adjusted R-squared statistic ranges from a maximum of 15% in 1993 to a minimum of −2% in 1992. Moreover, the adjusted R-squared statistics are negative for more than 45% of industries in four out of the seven sample years. In other words, the Jones models have zero explanatory power for a large number of industry-years. Even in the best year (1993), the cross-sectional Jones models fail to account for over 85% of the intra-industry variation in WCA, on average.

Panel A of Table 2 also reports the corresponding statistics for the margin model. As predicted, the coefficient on REV ($\lambda_2$) is positive in all seven sample years. Further, the magnitude of the coefficient lies within the feasible range for the gross profit margin on sales. The median coefficient on the CR term ($\lambda_2$) is negative in all estimation periods, as predicted. The coefficient magnitudes of $\lambda_2$ are similar to those reported for $\lambda_1$. The median adjusted R-squared statistic ranges from 41% (1993) to 7% (1994) and is significantly higher ($p < 0.001$) than that reported for the Jones models in six of the seven sample years. Consistent with this, the proportion of industries with essentially zero fit (i.e. zero or negative adjusted R-squared statistics) in a given sample year is also significantly lower than the equivalent figures for the Jones models.

Further insights may be gained by using the coefficient estimates reported in panel A of Table 2 to compute the elasticity of working capital accruals with respect to the drivers of 'normal' accruals for each of the three accruals models.[19] For the margin model, the net effect of a 1% change in REV and CR on working capital accruals ranges from 152% in 1993 to −5% in 1994. In contrast, the effect of a 1% change in ΔREV on working capital accruals for the s-J model ranges from 31% in 1993 to −0.18% in 1994. The equivalent elasticities for the m-J model are 26% in 1993 and −0.14% in 1994. The results indicate the higher responsiveness of working capital accruals to the drivers of normal accruals in the case of the margin model. This has both positive and negative implications regarding the relative performance of the margin model. On the positive side, a high elasticity is expected to result in improved estimates of abnormal accruals in situations where the drivers of working capital accruals are uncontaminated by earnings management (e.g., expense manipulation, excluding bad debts), due to increased precision in the estimate of normal accruals. On the negative side, a high elasticity means that the model will generate poorer estimates of abnormal accruals when either REV or CR are contaminated by earnings management (e.g., revenue manipulation), since a larger fraction of observed accrual activity will be incorrectly explained by the (contaminated) drivers of normal accruals. As an example of this effect, consider the elasticities for the s-J and m-J models: the higher elasticity associated with the s-J model reflects its tendency to unintentionally attribute a fraction of revenue manipulation to normal accrual activity.

In an effort to shed light on the reasons underlying the low explanatory power of all models for certain industry-year combinations, panel B of Table 2 reports additional information for the industry-year estimation portfolios, partitioned according to the adjusted R-squared statistics obtained

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[19] An elasticity measures the effect of a 1% change in an independent variable ($X_j$) on the dependent variable (Y). Elasticities, measured at the point of the means of the independent variables, are computed as $E_j = \hat{\beta}_j \frac{\bar{X}_j}{\bar{Y}}$.

**Table 2**

**Descriptive statistics for the Jones (s-J and m-J) models and the Margin model, estimated cross sectionally for each industry (*Datastream* Level-6) and year combination**[a]

*Panel A:* Descriptive statistics for the first-stage regression models

| | Jones models: $WCA_t = \alpha + \beta \Delta REV_t + e_t$ Median for industry groups[b] | | | | | | Margin model: $WCA_t = \lambda_0 + \lambda_1 REV_t + \lambda_2 CR_t + \eta_t$ Median for industry groups[b] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | $\alpha$ | $t_\alpha$ | $\beta$ | $t_\beta$ | Adj-$R^2$ | $\% \leq 0$[c] | $\lambda_0$ | $t_{\lambda 0}$ | $\lambda_1$ | $t_{\lambda 1}$ | $\lambda_2$ | $t_{\lambda 2}$ | Adj-$R^2$ | $\% \leq 0$[c] |
| 1990 | −0.002 | −0.179 | 0.046 | 0.458 | 0.064 | 29.03 | 0.008 | 0.138 | 0.545 | 2.464 | −0.552 | −2.514 | 0.311 | 22.58 |
| 1991 | −0.016 | −0.822 | 0.011 | 0.215 | 0.019 | 46.67 | 0.020 | 0.484 | 0.335 | 1.313 | −0.349 | −1.587 | 0.016 | 20.00 |
| 1992 | −0.007 | −0.434 | 0.024 | 0.567 | −0.017 | 54.84 | −0.001 | −0.015 | 0.464 | 1.855 | −0.492 | −1.855 | 0.173 | 9.68 |
| 1993 | −0.012 | −0.571 | 0.068 | 1.495 | 0.149 | 34.48 | −0.004 | −0.174 | 0.472 | 2.245 | −0.444 | −2.144 | 0.413 | 13.79 |
| 1994 | 0.004 | 0.220 | −0.007 | −0.193 | 0.075 | 14.94 | 0.007 | 0.266 | 0.261 | 1.045 | −0.284 | −1.005 | 0.075 | 32.26 |
| 1995 | 0.008 | −0.385 | 0.020 | 0.136 | 0.029 | 48.39 | 0.015 | 0.300 | 0.301 | 1.207 | −0.379 | −1.380 | 0.156 | 29.03 |
| 1996 | −0.002 | −0.107 | 0.029 | 0.475 | −0.014 | 53.13 | 0.006 | 0.193 | 0.391 | 1.638 | −0.432 | −1.828 | 0.192 | 25.00 |

*Panel B:* Industry-year portfolios, partitioned according to the goodness-of-fit of the first-stage regressions

| Mean of industry-year portfolios | Very poor fit: ($R^2 < 0$) | Poor fit: ($0 < R^2 < 5\%$) | Good fit: ($R^2 > 20\%$) | F[d] | Very poor fit: ($R^2 \leq 0$) | Poor fit: ($0 < R^2 < 5\%$) | Good fit: ($R^2 > 20\%$) | F[d] |
|---|---|---|---|---|---|---|---|---|
| Number of firms | 18.716 | 20.130 | 19.807 | 0.490 | 18.277 | 18.762 | 21.275 | 1.728 |
| Stand. dev. of WCA | 0.075 | 0.074 | 0.077 | 0.231 | 0.075 | 0.067 | 0.077 | 1.654 |
| Recurring industries:[e] | Clothing & footwear<br>Vehicle distributors<br>Other building materials<br>Engin. vehicle components<br>Aerospace<br>Broadcasting<br>Chain stores<br>House building<br>Leisure facilities<br>Multi-stores<br>Business support<br>Publishers | NA | Breweries, pubs & restaurants<br>Electrical equipment<br>Oil exploration & production | | House building | NA | Clothing & footwear<br>Electrical equipment<br>Breweries, pubs & restaurants<br>Paper, packaging & printing<br>Other construction<br>Broadcasting<br>Medical products<br>Engineering<br>Fabricators<br>Electronics<br>Ind. components<br>Diversified industrials | |

[a] The Jones models and the margin model are estimated separately for each industry-year combination. The minimum number of observations in an estimation portfolio is ten. Since the s-J and m-J models are equivalent at the estimation stage, we report only a single set of results for these two models in the columns headed 'Jones Models'. Working capital accruals (WCA) are defined as non-cash assets minus current liabilities (excluding the current portion of long-term debt). REV is total sales revenue, CR is cash received, measured as total sales minus the change in trade debtors.

[b] The number of industry groups in 1990 (1991, 1992, 1993, 1994, 1995, 1996) is 31 (30, 31, 29, 31, 31, 32).

[c] The percentage of industry groups where the adjusted-$R^2$ is negative.

[d] The F-Statistic from a one-way ANOVA testing the difference in means across the three goodness-of-fit categories.

[e] *Datastream* Level-6 industry groups where the adjusted-$R^2$ meet the goodness-on-fit criteria in at least four years during the sample period.

from the first-stage regression models. For both the Jones and the margin models, an F-test fails to reject the null hypothesis that the mean number of observations in the estimation portfolios differs across the three goodness-of-fit partitions. These findings indicate that sparse data is unlikely to be the primary factor driving the low explanatory power for certain industry-year combinations. Similarly, there is no evidence that a difference in the variability of WCA within the industry-year portfolios underlies the low adjusted R-square values. Finally, panel B also reports the primary industry groups (i.e. those represented at least four times) in each goodness-of-fit partition. No obvious industry patterns are apparent.

The precise reasons why the models fit well in some settings and poorly in others remain unclear. This can be viewed as a weakness of the current state of the art in modelling accruals management. A model that accounts for only a small proportion of the variation in working capital accruals is effectively doing little more than defining abnormal accruals as total accruals plus (a large amount of) measurement error. It is important to note, however, that a relatively high R-squared statistic does not necessarily guarantee that a particular model is effectively partitioning accrual activity into normal and abnormal components. Hence, the effectiveness of the models at detecting earnings management must remain an open empirical issue, one that we address in the remainder of the paper.

### *4.2. Model specification*

Table 3 presents the results of our tests for the presence of earnings management where by construction none exists (i.e., Type I errors), for each of the s-J, m-J, and margin models. Type I errors from one-tailed tests are reported for both the null hypothesis that abnormal accruals are greater than or equal to zero (*alternative hypothesis*: income-decreasing earnings management) and the null hypothesis that abnormal accruals are less than or equal to zero (*alternative hypothesis*: income-increasing earnings management). Recall that since the sampling procedure helps ensure that firms where PART equals one are unlikely to be characterised by systematic earnings management activity, a well-specified model should not reject the null hypothesis of no earnings management at rates that significantly exceed the test level (e.g. 5% or 1%).[20] Consistent with the findings reported by Dechow et al. (1995), the frequency of Type I errors in Table 3 corresponds to the specified test levels for all three models: in all cases a binomial test fails to reject the null hypothesis that the observed rejection frequencies equal the specified test levels. These findings suggest that all three cross-sectional accrual models appear well-specified when applied to a random sample of firm-years.

Results presented in Table 4 assess the relative specification of abnormal accrual models when cash flow performance is extreme. Because the same firm-year observations are used to compute abnormal accruals for each of the three models, any differences in distributional properties of estimated abnormal accruals must be due to the underlying accrual model rather than any time- or firm-specific factors. Results for the low (high) CFO partition reveal that all three models generate positive (negative) abnormal accrual estimates of around 6 to 7% of lagged total assets. This is consistent with all three models inducing positive (negative) measurement error when cash flows are

**Table 3**

**Comparison of Type I error rates for abnormal accruals estimated using the standard-Jones (s-J), the modified-Jones (m-J) and margin models. Percentage of 700 randomly selected firm-years for which the null hypothesis of no earnings management is rejected using a one-tailed test**[a]

| Alternative hypothesis<br>Null hypothesis | *Income-increasing accruals*<br>Earnings management $\geq 0$ | | *Income-decreasing accruals*<br>Earnings management $\leq 0$ | |
|---|---|---|---|---|
| Test level: | 5% | 1% | 5% | 1% |
| s-J model t-test | 5.4% | 1.7% | 5.9% | 1.3% |
| m-J model t-test | 6.3% | 1.4% | 5.4% | 1.3% |
| margin model t-test | 5.1% | 0.9% | 5.0% | 1,3% |

[a] Simulations for each abnormal accrual model are performed using 100 random samples of 25 firms in each of the seven sample years (1990-1996), resulting in a total of 700 simulations per model.

*Significantly different from the specified test level at the 5% level using a two-tailed binomial test.

**Significantly different from the specified test level at the 1% level using a two-tailed binomial test.

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[20] As Dechow et al., (1995: 200) point out, this is simply a test of whether the Gaussian assumptions underlying regression (9) are satisfied.

**Table 4**
**Descriptive statistics for abnormal accruals, partitioned by cash flow from operations scaled by lagged total assets (CFO). Abnormal accruals are estimated using the Standard-Jones (s-J), the modified-Jones (m-J) and margin models[a]**

| CFO Decile | | Abnormal accrual model | | | *p*-value for difference between:[b] | | |
|---|---|---|---|---|---|---|---|
| | | s-J | m-J | margin | s-J vs. m-J | s-J vs. margin | m-J vs. margin |
| Low | Mean | 0.0736 | 0.0762 | 0.0603 | 0.001 | 0.001 | 0.001 |
| | Median | 0.0693 | 0.0705 | 0.0561 | 0.001 | 0.001 | 0.001 |
| | St. dev. | 0.0883 | 0.0908 | 0.0783 | | | |
| 2 | Mean | 0.0369 | 0.0381 | 0.0299 | 0.055 | 0.001 | 0.001 |
| | Median | 0.0351 | 0.0352 | 0.0281 | 0.002 | 0.001 | 0.001 |
| | St. dev. | 0.0552 | 0.0590 | 0.0486 | | | |
| 3 | Mean | 0.0172 | 0.0174 | 0.0154 | 0.672 | 0.263 | 0.269 |
| | Median | 0.0136 | 0.0143 | 0.0129 | 0.853 | 0.501 | 0.510 |
| | St. dev. | 0.0499 | 0.0513 | 0.0474 | | | |
| 4 | Mean | 0.0088 | 0.0102 | 0.0083 | 0.001 | 0.748 | 0.260 |
| | Median | 0.0070 | 0.0074 | 0.0061 | 0.022 | 0.379 | 0.209 |
| | St. dev. | 0.0515 | 0.0533 | 0.0457 | | | |
| 5 | Mean | 0.0022 | 0.0028 | 0.0026 | 0.045 | 0.793 | 0.880 |
| | Median | 0.0014 | 0.0016 | 0.0017 | 0.119 | 0.469 | 0.702 |
| | St. dev. | 0.0475 | 0.0490 | 0.0451 | | | |
| 6 | Mean | −0.0042 | −0.0038 | −0.0021 | 0.256 | 0.179 | 0.328 |
| | Median | −0.0074 | −0.0068 | −0.0032 | 0.284 | 0.321 | 0.443 |
| | St. dev. | 0.0503 | 0.0517 | 0.0465 | | | |
| 7 | Mean | −0.0144 | −0.0141 | −0.0106 | 0.242 | 0.002 | 0.008 |
| | Median | −0.0101 | −0.0092 | −0.0075 | 0.091 | 0.002 | 0.010 |
| | St. dev. | 0.0486 | 0.0490 | 0.0465 | | | |
| 8 | Mean | −0.0189 | −0.0178 | −0.0146 | 0.090 | 0.011 | 0.099 |
| | Median | −0.0137 | −0.0134 | −0.0116 | 0.203 | 0.001 | 0.002 |
| | St. dev. | 0.0573 | 0.0609 | 0.0527 | | | |
| 9 | Mean | −0.0352 | −0.0349 | −0.0313 | 0.415 | 0.013 | 0.036 |
| | Median | −0.0318 | −0.0324 | −0.0271 | 0.140 | 0.022 | 0.100 |
| | St. dev. | 0.0642 | 0.0648 | 0.0593 | | | |
| High | Median | −0.0651 | −0.0658 | −0.0563 | 0.273 | 0.001 | 0.001 |
| | Median | −0.0519 | −0.0565 | −0.0495 | 0.965 | 0.001 | 0.001 |
| | St. dev. | 0.0830 | 0.0831 | 0.0783 | | | |

[a]Cash flow from operations is computed as operating income minus the change in non-cash working capital, plus depreciation and amortisation of intangible fixed assets, all scaled by lagged total assets. The CFO deciles are formed by ranking all observations within their sample year.
[b]The differences in means (medians) are evaluated using a paired t-test (Wilcoxon test). *P*-values relate to two-tailed tests.

unusually low (high).[21] Examination of the *relative* magnitudes of abnormal accruals reveals that the margin model produces less extreme estimates than those generated by the two Jones models. For example, in the low CFO portfolio, mean (median) abnormal accruals for the margin model are 6.0% (5.6%) of lagged total assets, compared with around 7.5% for the s-J and m-J models. These differences are significant at the 0.001 level. Similarly, in the high CFO portfolio, the mean level of abnormal accruals for the margin model is −5.6% of lagged total assets, compared with −6.5% for the s-J and m-J models (difference significant at the 0.001 level). To the extent that extreme operating cash flows induce bias in estimated abnormal accruals, these results are consistent with the margin model being somewhat better specified than either the s-J model or the m-J model when cash flow performance is extreme. Note, however, that due to the nature of our empirical tests we are unable to make inferences regarding the absolute level of measurement error. In particular, we make no claim that the margin model is completely free of measurement error.

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[21] An alternative explanation for the positive (negative) abnormal accruals observed in the low (high) cash flow portfolio is that these firms are systematically managing their earnings upwards (downwards) as a means of smoothing reported income. Indeed, it is the inability to distinguish between measurement error and earnings management that makes it impossible to draw inferences about absolute model specification in these portfolios.

Further analysis of Table 4 indicates several other findings worthy of comment. First, the margin model's apparently superior specification does not appear to be confined to the two extreme CFO portfolios. For example, relative to estimates generated by the s-J and m-J models, margin model abnormal accruals are less positive in CFO decile 2 and less negative in CFO deciles 7–9. Secondly, abnormal accruals generated by the s-J model are significantly lower than those generated by the m-J model when cash flows are unusually low (CFO deciles 1 and 2), suggesting the s-J model's relative superiority when applied to firms with low operating cash flows. Finally, estimated abnormal accruals produced by the three models are indistinguishable from each other and close to zero in the mid cash flow portfolios (CFO deciles 5 and 6), confirming the earlier finding that all models appear to be reasonably well-specified when applied to firms characterised by 'normal' operating performance.

### *4.3. Power to detect earnings management*

This section reports the results of simulations using artificially induced income-increasing earnings management. Figure 1 provides information regarding the relative power of alternative models at detecting earnings management. The graphs plot the frequency with which the null hypothesis of no earnings management is rejected (vertical axis) against the magnitude of the induced earnings management (horizontal axis). While we experiment with different magnitudes of income-increasing accruals management ranging from 0% to 100% of firms' lagged total assets, the graphs in Figure 1 only plot earnings management levels up to 10% of lagged total assets, as in most cases the detection rates reached 100% at or well before this generating relatively powerful tests for economically plausible levels of accruals management. Specifically, all three models generate rejection frequencies for the null hypothesis of no income-increasing earnings management at (or close to) 100% for artificially induced accrual manipulations of around 6% of lagged total assets or greater. These results hold for rejection frequencies evaluated at either the 5% or 1% test levels. Even for relatively low accruals manipulations of around 2% of lagged total assets, the rejection frequencies can be as high as 40%, depending on the particular accrual model used and the specific type of earnings management considered. These results contrast with the much lower rejection frequencies reported by Dechow et al. (1995) for the time-series versions of the Jones and modified-Jones models. For example, Dechow et al. (1995) report rejection rates of less than 30% for earnings management equal to 5% of total assets, with the rates only approaching 100% when artificially induced earnings management exceeds 50% of total assets.

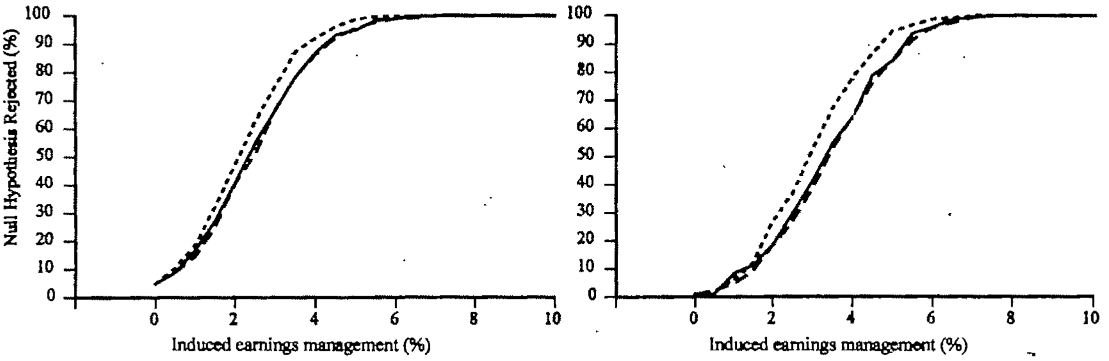
Regarding the models' relative power to detect earnings management, a noticeable feature of the power functions presented in Figure 1 is the apparent similarity in performance of the s-J and m-J models, particularly in relation to revenue manipulation (panel C). Our results therefore fail to confirm the findings reported by Dechow et al. (1995) that the m-J model is significantly more powerful at detecting revenue-based manipulations. We attribute this result to the small coefficient estimates reported for the Jones models in Table 2, which act to dampen down the effect of revenue manipulations that contaminate the ΔREV term. In other words, when the estimated coefficient on ΔREV is as low as that reported in Table 2, it makes little difference whether or not ΔREV is adjusted for the change in debtors associated with revenue manipulation.

While all three models evaluated in this study appear capable of detecting relatively low magnitudes of accruals manipulation, results presented in Figure 1 suggest some important differences with respect to the performance of the Jones models (s-J and m-J) and the margin model. For ex-

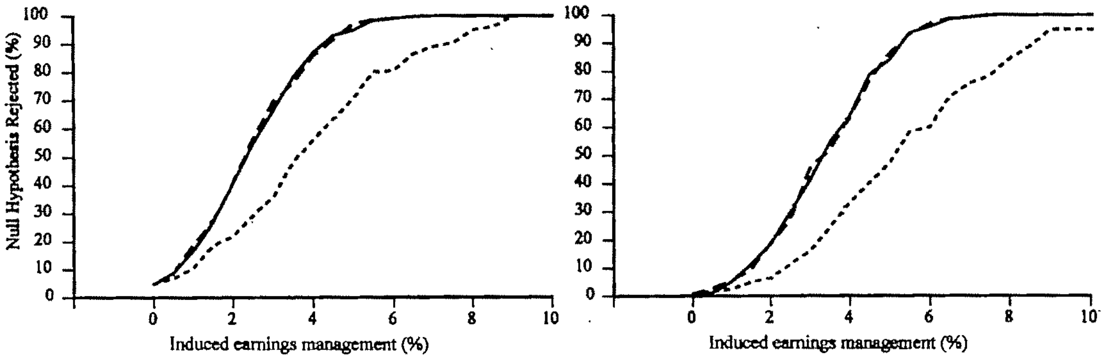
**Figure 1**
**Simulation results of power functions for tests of earnings management using abnormal accruals. Simulations are performed using artificially induced amounts of earnings management ranging from 0% to 10% of lagged total assets using one-tailed test levels of 5% and 1%. The number of simulations is equal to 700. Abnormal accruals are estimated using the standard-Jones (solid line), the modified-Jones (dashed line) and margin (dotted line) models.**

**Test level = 5%** **Test level = 1%**

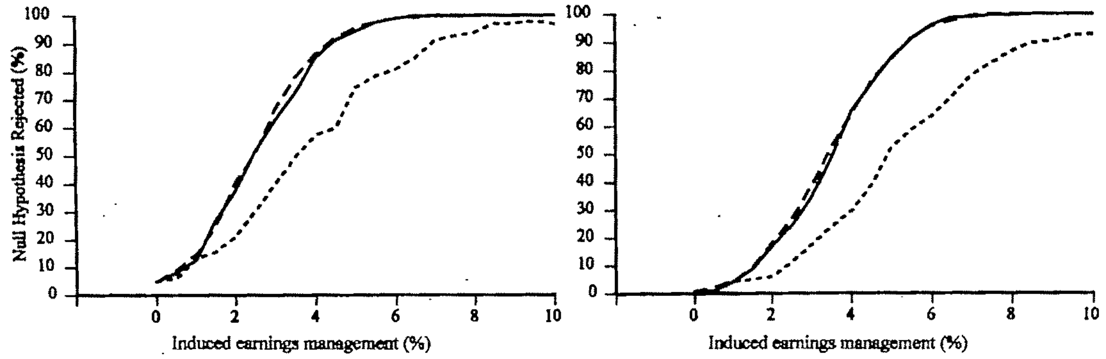
Panel A: Expence manipulation



Panel B: Bad debt manipulation



Panel C: Revenue manipulation



mal accrual activity are not contaminated by earnings management. In contrast, the s-J and m-J models are significantly better than the margin model at detecting both bad debt manipulation (panel B) and revenue manipulation (panel C). This is because the smaller coefficent estimates obtained in the first stage fit of the Jones models serve to dampen-down the effect of earnings management that contaminates the drivers of normal accruals. In contrast, the larger coefficient estimates reported in Table 2 for the margin model are associated with a reduction in the model's power to detect earnings management because a greater fraction of the artificially induced accruals manipulation is incorrectly attributed to normal accruals activity.

## 5. Summary and conclusions

This paper examines specification and power issues relating to the measurement of abnormal accruals using cross-sectional estimation procedures. While Guay et al. (1996), Dechow et al. (1995) and Kang and Shivaramakrishnan (1995) have evaluated the performance of accrual models estimated in time series, examination of the literature indicates that cross-sectional models are now more widely used in contemporary earnings management studies. Jeter and Shivakumar (1999) assess the performance of cross-sectional abnormal accrual models using US data. Our paper presents further evidence on the performance of cross-sectional models, including their power to detect artificially induced accrual management. In addition to evaluating the performance of cross-sectional versions of the models proposed by Jones (1991) and Dechow et al. (1995), we also develop and test an alternative procedure, labelled the margin model. The margin model differs from existing procedures in that the drivers of normal accruals are derived from a formal model linking sales, accruals and earnings.

Results indicate that all three cross-sectional models appear well specified when applied to a random sample of firm-years. However, additional tests indicate that the margin model generates relatively better specified estimates of abnormal accruals when cash flow performance is extreme. In particular, abnormal accrual estimates produced by the margin model are significantly lower (higher) than those generated by either the standard-Jones or modified-Jones models when operating cash flows are unusually high (low). Further analysis designed to assess the models' ability to detect known cases of accruals management indicates that all three procedures appear capable of generating high power tests for earnings management upwards of 5% of lagged total assets: for earnings management exceeding five percent of lagged total assets, all three models yield detection rates close to 100%. In contrast, Dechow et al. (1995) report rejection frequencies of between 20% and 30% for their time-series models for artificially induced earnings management equal to 5% of total assets. To the extent that comparisons across different studies using accounting data produced under different institutional regimes are meaningful, these results provide some support for Subramanyam's (1996) findings that cross-sectional accrual models may be more powerful than their time-series counterparts. Note, however, that the Dechow et al. (1995) models are based on a measure of total operating accruals (i.e. including depreciation), while the models examined in this paper are defined in terms of working capital accruals. This raises the possibility that the differences in rejection frequencies between the two studies may be due to differences in the way accruals are defined, rather than to the use of alternative estimation procedures. As such, an alternative interpretation of the high rejection rates documented for the models in this study is that a pure working capital accruals measure may be more powerful than an operating accruals measure when earnings are managed via working capital accounts. Future research aimed at formally comparing the power of (a) alternative estimation procedures and (b) alternative accrual definitions would therefore represent an interesting contribution to the literature.

Regarding the relative power of the three models, findings suggest that the standard-Jones and modified-Jones models are substantially more powerful at detecting subtle revenue and bad debt manipulations (i.e., less than 10% of lagged total assets in magnitude). Thus, despite their ad hoc nature, these models still appear to represent relatively powerful solutions to the problem of detecting certain types of accrual management. The price for this improved detection power, however, is greater misspecification when cash flow performance is extreme. Contrary to Dechow et al. (1995), we fail to document any significant difference in the relative power of the Jones and modified-Jones models to detect revenue manipulations. We attribute this result to the relatively small change in revenue coefficient estimates obtained from the first-stage regressions. In contrast to the findings for revenue and bad debt manipulations, the margin model outperforms the standard- and modified-Jones models at detecting non-bad debt expense manipulations ranging from 1.5% to 6.5% of lagged total assets. We note, however, that the improved power of the margin model over that of the s-J and m-J models in relation to non-bad debt manipulations has to be balanced against its lower ability to detect revenue and bad debt manipulations.

An interesting implication of our results concerns the magnitude of the coefficient estimates from the first-stage regressions explaining total accruals activity. In particular, our results show that while a large coefficient is good news if the associated explanatory variable is not 'contaminated' by the accrual manipulations the researcher is attempting to detect, it can be bad news when contamination is present. In the latter case, a smaller coefficient dampens down the effect of the contamination. It may therefore sometimes be better to work with a poorly fitting expectations model of accruals (or, indeed simply with observed accruals) when the explanatory variables are either contaminated by the accruals manipulations or they are correlated with these manipulations.

Finally, in terms of providing practical guidance on the question of which abnormal accruals model to use, our results imply that this decision is likely to be contingent on the form the earnings management is expected to take. If earnings management via revenue or bad debt accounts is anticipated, then the standard-Jones and modified-Jones models appear to offer the greatest chance of detecting it. Alternatively, if expense manipulation (exclusive of bad debts) is anticipated, then the margin model may be more appropriate. In the absence of any strong priors regarding the specific type of manipulation used, our results suggest that using all three models in combination may afford the greatest chance of detecting earnings management. Irrespective of the specific approach used, however, accurate detection of small-scale accruals management (i.e., less than 5% of total assets in magnitude) remians fraught with difficulty.

## References

Becker, C., DeFond, M. L., Jiambalvo, J. and Subramanyam, K. R. (1988). 'The effect of audit quality on earnings management'. *Contemporary Accounting Research*, 15 (Spring): 1–24.

Beneish, M. D. (1988). 'Discussion of "Are accruals during initial public offerings opportunistic?" '. *Review of Accounting Studies*, 3 (1–2): 209–221.

Dechow, P. Kothari, S. P. and Watts, R. (1998). 'The relation between earnings and cash flows'. *Journal of Accounting and Economics*, 25 (2): 133–168.

Dechow, P., Sloan, R. and Sweeney, A. (1995). 'Detecting earnings management'. *The Accounting Review*, 70 (April): 193–225.

DeFond, M. L. and Jiambalvo, J. (1994). 'Debt covenant violation and the manipulation of accruals'. *Journal of Accounting and Economics*, 17 (1–2): 145–176.

Guay W. R., Kothari, S. P. and Watts, R. (1996). 'A market-based evaluation of discretionary accrual models'. *Journal of Accounting Research*, 34 (Supplement): 83–105.

Healy, P. (1985). 'The effect of bonus schemes on accounting decisions'. *Journal of Accounting and Economics*, 7 (April): 85–107.

Jeter, D. C. and Shivakumar, L. (1999). 'Cross-sectional estimation of abnormal accrual models using quarterly and annual data: effectiveness in detecting event-specific earnings management'. *Accounting and Business Research*, 29 (Autumn): 299–319.

Jones, J. (1991). 'Earnings management during import relief investigations'. *Journal of Accounting Research*, 29 (Autumn): 193–228.

Kang, S.-H. and Shivaramakrishnan, K. (1995). 'Issues in testing earnings management and an instrumental variable approach'. *Journal of Accounting Research*, 33 (Autumn): 353–367.

Subramanyam, K. R. (1996). 'The pricing of discretionary accruals'. *Journal of Accounting and Economics*, 22 (1–3): 249–281.

Teoh, S. H., Wong, T. J. and Rao, G. R. (1998). 'Are accruals during initial public offerings opportunistic?'. *Review of Accounting Studies*, 3 (1–2): 175–208.

Young, S. (1999). 'Systematic measurement error in the estimation of discretionary accruals: an evaluation of alternative modelling procedures'. *Journal of Business, Finance and Accounting*, 26 (September–October): 833–862.

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Watts, R. L. and Zimmerman, J. L. (1986). *Positive Accounting Theory.* Englewood Cliffs, NJ: Prentice-Hall.

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